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CLAREMONT COLLEGE READING CONFERENCE

Thirteenth Yearbook 1948

CONFERENCE THEME

IMPLEMENTING THE PROCESS OF READING ONESELF, OTHER PEOPLE AND THINGS WHICH AFFECT HUMAN BEHAVIOR

Sponsored by The Claremont Graduate School
and
Alpha Iota Chapter of
Pi Lambda Theta

CLAREMONT COLLEGE CURRICULUM LABORATORY
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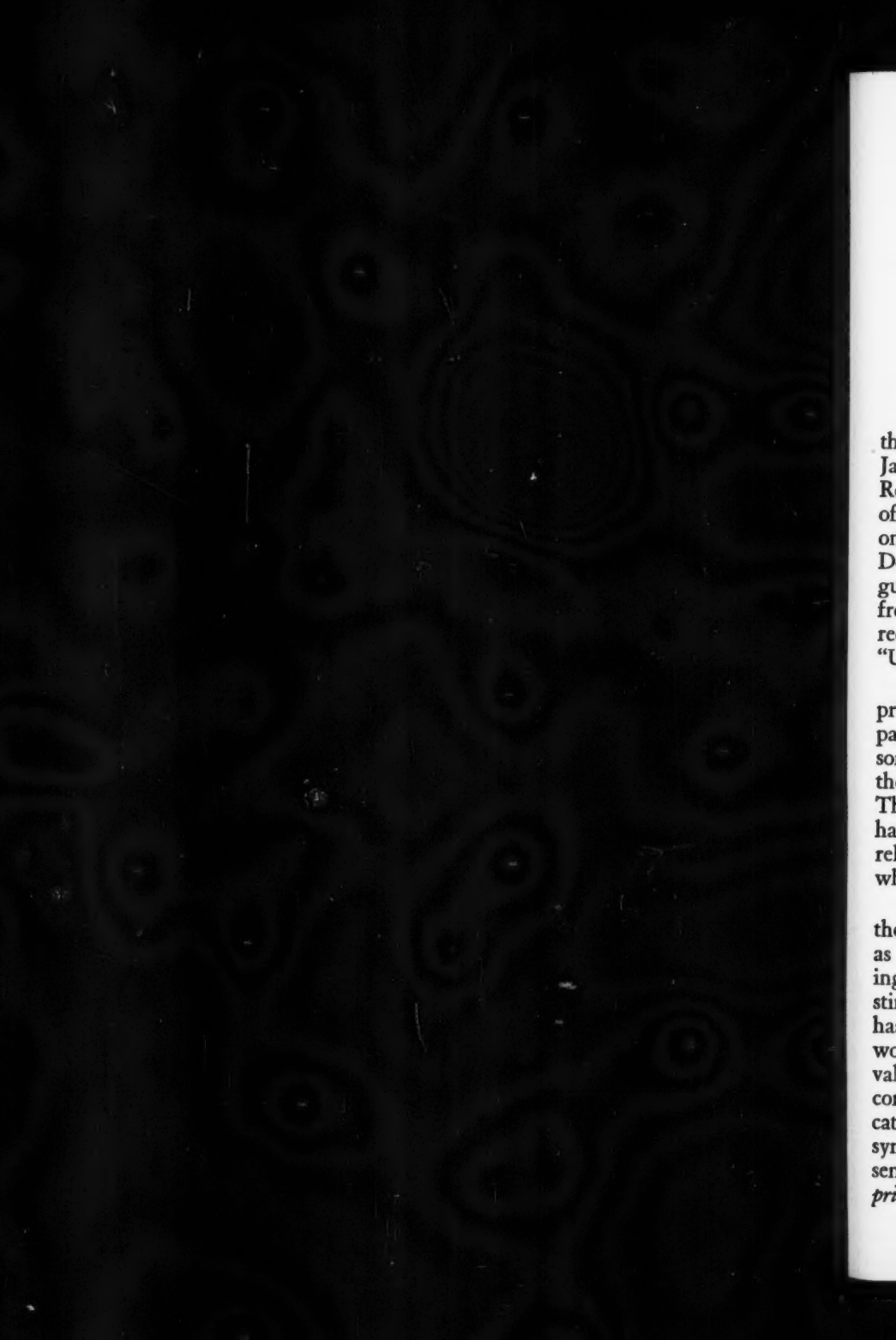

PREFACE

Peter L. Spencer, Professor of Education and Director of Claremont College Reading Conference

Thirteen is a number with unusual significance for citizens of these United States. It was thirteen years after the founding of Jamestown that the Pilgrims established a settlement at Plymouth Rock. Thirteen times thirteen years elapsed between the founding of Jamestown and the issuance of the Declaration of Independence on the part of the thirteen colonies. Thirteen years passed from the Declaration of Independence until the first President was inaugurated. And thirteen times thirteen years measures the interval from the Declaration of Independence to the termination of the recent armed conflict which Mr. Churchill so pertinently terms the "Unnecessary War."

The Claremont College Annual Reading Conference does not presume that this, its *thirteenth* yearbook, has a significance comparable to that of any of the events mentioned above but the sponsors do wish to express their pride in the thirteen volumes which the Conference has contributed to the literature on reading. Throughout its existence this conference, like American Democracy, has concerned itself with the welfare of the individual and of social relationships, and with the understanding and practical use of things which promote such welfare.

The Conference and the yearbooks developed in conjunction therewith have consistently sought to broaden the concern of people as regards the nature of the reading process. Fundamentally reading is the process by which behavior is adapted with regard for any stimulus. But in educational practice concern for the reading process has too largely been confined to the use of that process with printed word materials. The Claremont Conference, while recognizing the value of and the need for effective reading of printed words, has consistently pointed out that such reading is only one type of application of the basic reading process and that effective reading of any symbolic material presupposes a reading of the actual things represented by the symbols. "Things—ideas—symbols" constitutes a *primary* order of behavioral development with reading being the

process by means of which the development is achieved. Obviously, symbols once created potentially serve to stimulate and direct the recall of ideas and thereby may serve as a *secondary* type of stimulus.

"The proper study for man is man." Hence, the sixteenth annual session of the Claremont College Reading Conference and the thirteenth yearbook have directed their concern toward, "Implementing the Process of Reading Oneself, Other People, and Things which affect Human Behavior." The significance of this reading problem was pertinently expressed by Anne Bryan McCall in the Eleventh Yearbook:

> "If parents could read children's human behavior and tendencies; if older people could read youth, and young people were better readers of older people; if teachers and pupils, husbands and wives, brothers and sisters, friends and enemies, in short if all of us could read one another better! If we were better readers of ourselves, if we could read at a glance our own abilities, our rich human endowments well enough to mend our mistakes and correct our misunderstanding, how many would live richer, more efficient lives! How much less waste. What a lessening of follies and unhappiness!"

The organization of the yearbook is designed to lead the reader to consider people first as individuals and as participants in social relationships (Division I). The next consideration has to do with personal conditions which affect the operation of the reading process (Division II). In this connection the visual and aural senses are treated, glandular influences, and finally psychological aspects of reading are considered.

The final section of the yearbook deals with various types of "things" which are affective factors in reading (Division III). Man is an inveterate creator and user of symbols. Hence, symbols and symbolic expressions constitute real problems in achieving communication. These are treated in a delightful manner by an eminently competent writer.

Color and color dynamics profoundly influence reading. Whether reference is made to the color of school room walls, to textbook illustrations, or to any other of the many and varied uses of color, there is no doubt but that color is something to read.

Much has been said recently of the use of "audio-visual aids to learning" among which the motion picture film has been given

great prominence. Do people intuitively read such films effectively or must they be taught how to accomplish such reading?

Finally, what of the use of books as a stimulus for reading? These are indicative of the wealth of materials and interests which a broad conception of the reading process suggests. They are presented for your consideration.

Division I

Reading Oneself and Reading Other People

"We are constantly revealing ourselves."
Gertrude Laws

READING ONESELF AND READING OTHER PEOPLE

INTRODUCTION

Human behavior evidences great variety in abilities to read. Those people whose behavior aptly fits the demands of the situations which they meet have read well. Those whose behavior is not well adapted with the demands are poor readers. There is need for the development of abilities to read more astutely ourselves and other people and to read more effectively those things which affect human behavior. We may try to satisfy this need as the poet did by means of an appeal to powers beyond our personal capabilities. (Oh! That some power had the gift to give us to read ourselves as others read us!) Or on the other hand we may "tighten our belts" and attempt to develop the desired abilities through our own efforts. This latter procedure appeals to the sponsoring bodies of this yearbook as having greater potentiality for success.

Dr. Haas pertinently asks "Can we read human relations?" He answers the question affirmatively but shows that much of such reading currently is poorly done. The description of a program of development by means of which teachers became better readers of their pupils has a message for everyone who may contact it.

"Reading Others" is a process in which man has long been engaged, according to Dr. Mateer. She points out the importance of such reading being well done and tells of the progress that has been made in implementing and facilitating it through clinical procedures.

As surely as there are parents or teachers, there will occur the need for *"elementary reading"* of the type Dr. Laws so competently discusses. The fulfillment of our democratic ideal can be attained only as this type of reading is highly developed by all members of our society. Deficiencies with "social reading" are destructive of both personal and social welfare.

LEARNING TO READ OURSELVES AND OTHERS: AN APPROACH THROUGH SOCIOMETRY AND THE PSYCHODRAMA

Robert Bartlett Haas, Associate Director Pacific Coast Council on Intercultural Education

The "action approach" to human interrelations has been the unique contribution of Dr. J. L. Moreno, social psychiatrist and educator, whose volumes *Who Shall Survive* (1934) and the *Theatre of Spontaneity* (1923/1947) formulated the twin communications methodologies now widely known as *sociometry* and the *psychodrama.*

Both are founded on a "socio-interactional" theory of personality —a conception of the self as the totality of social and private roles one plays in his interpersonal and intergroup contacts. The way he plays these roles in relation to the counter-roles of others, and the statuses he achieves in the concrete social situations to which he is constantly responding, gives him his uniqueness as a person.

For Moreno the *roles* of the individual, and of the individuals who make up the groups in which he functions, are the measurable units of behavior. The ability to *read* one's own roles and the roles of others, then to produce appropriate role-responses, is the skill essential in furthering human enterprises. Many factors tend to block success. We may not be able to meet the unpredictable aspects of the other person's role-behavior satisfactorily; the demands and taboos of our culture may interpose barriers which we cannot overcome; highly personalized attitudes, habits and value-patterns may prevent our accurate reading of a complex situation. In order to relieve these blockages, which frequently cause us to mis-read and mis-evaluate ourselves and others, and to replace them with a process which will allow for the growth of "proper evaluative reactions," Moreno has developed the concept of *spontaneity,* the basis of a therapeutic approach to interpersonal and intergroup maladjustments.

> "Spontaneity is the ability of a subject to meet each new situation with adequacy." "It is a *plastic adaptation skill,* a mobility and flexibility of the self, which is *indispensable to a rapidly growing organism in a rapidly changing environment.*" (1)

The spontaneous individual is creative in his moment to moment

adjustments. His flexibility enables him to read concrete situations accurately and fully. He evaluates, is aware of alternatives, plays his roles of response resourcefully. The person low in spontaneity will reflect his lack in *stereotyped* or *conventional* role-playing—reading just enough of the situation, of himself, of the others, to get by. The person who is impulsive rather than spontaneous will err in the opposite direction; he will mis-read and mis-evaluate, and his role-responses will be irrelevant or even irrational.

Action-research has built experimental techniques out of the concepts of *role* and *spontaneity*. (a) The Sociometric Test, (2) for example, allows an observer to tap the spontaneous *choice and rejection patterns* which pass between the members of a group and condition the psychological "atmosphere" in which they function. Such a test may be read as a charting of who in the group is unchosen, who is highly chosen, who is rejected, who depends on whom, who is independent of whom, who is hostile to whom, and so on. These data disclose the kind of status and prestige individuals are earning through their role-playing in a real life situation. To a degree they disclose the subjective motivations for the behavior of individuals in the group. (b) The Situation Test, (3) a psychodramatic technique, allows the observer to follow the *role-behavior* of individuals through a planned series of real-life or life-like situations. In doing so he may read the living evidence of his subject's role, inter-actional, and spontaneity processes. He may also discover how—and how well—the individual is reading himself and the others who function as co-actors in his life-situation.

Exploration of the individual and his groups represents only one aspect of action research. Re-training and therapeutic phases follow, Sociometric Guidance (4) for example, puts group-members into optimal work or play relationships. Sociodramatic Guidance (5) explores and treats, at one time, members of a group who share similar problems; Psychodramatic Guidance (6) treats the individual in relation to his group. The literature is full of detailed accounts of these procedures. Perhaps the least remarked aspect of the action approach, yet a most frequent accomplishment, is its effectiveness in stimulating that *self-other evaluation and accommodation* through which human beings in association become more insightful readers of one-another, and, in consequence, more efficient and effective human communicators.

Can we READ Human Relations? An orthodox Jewish parent recently asked my help in clarifying a situation which had troubled her deeply. Her son, in the second grade, brought home the ques-

tion, "Mother, who is the Son of God?" She weighed her answer carefully before she said, "There are many answers to that question, son, because there are many different religious beliefs in the world. And although each person has a right to his own belief, he has a responsibility to respect the other fellow's. Do you understand?"

This solved nothing for the boy, and he asked again, "Who is the Son of God?" The mother tried once more. "Those of the Christian faith believe Jesus to have been the Son of God. The Jews think of him not as the Son of God, but rather as a very great man—a prophet, perhaps, or a great philosopher."

The child seemed unconvinced. Then he said, "I am going to believe the teacher. She has been in school longer than you."

At first the mother was only amused; then she began to recall other things. Once before the boy had announced at dinner, "The teacher said Christ was the first good man ever born." She had let that pass. But for three years she had sat through the school's Christmas programs, listening to the carols and watching the pageant of the birth of Christ. Wouldn't the Christian children enjoy seeing a pageant of Hannukah? Certainly if the school would consider presenting it along with the Christian story, every Jewish child would have something of deep value to him too. Could it be that in this school, with its predominantly Jewish population, the unconcern for feelings was deliberate? Perhaps the thing to do was to forget it, but the parent spoke about these things to the teacher one day.

The reply was surprisingly curt. "After all, this is a Christian Century, isn't it?" And when the teacher later relayed the occurrence to her principal she added, "When will the minority learn that the majority group runs things in a democratic country, and that they have some obligation to conform?" Each of the actors in this little drama may have slept soundly in the belief they had read the "right" books. Clearly, they were not reading people.

Similar stories come to my attention frequently. Sometimes the Christian child has the minority status. Sometimes the problem has a racial rather than a religious source. Sometimes prejudicial attitudes are directed toward the underprivileged child, the snobbish child, the dominating administrator, the unsympathetic teacher. Always there is a breakdown, somewhere along the line, in a genuine concern for what the *other* person is, or wants, or values. When such tension situations persist (and they do, more or less, everywhere) what the home and the school and the child have in

common are only their differences, their insecurities, and their frustrations.

Because children especially are victimized by the conflicts generated in such situations as the one reported above, educators have begun to study the techniques for resolving communication blockages. The goal is that we become able to *share with one another,* what we are, what we want, what we value, rather than having to hide it or "conform" in order to avoid conflict with the other person. Civilization has not yet reached the stage in which individuals or groups can't learn something from honest exchange with the other side. As we begin to put first things first, the problem gets clearer:

> "Our big educational job right now is to learn to live decently with the people in our block, our city, our state, our nation, and the rest of the world. Our job is to master the art of getting along together, to learn the science of human relationships." (7)

In other words, we must learn effectively to read ourselves, other people, and the things which affect our living together.

The pupil-teacher-parent relationship presents a fertile field for group guidance. To the degree that the roles of the three mesh and complement one another in a cooperative way, the educational expectancies of each are adequately met. The further apart the expectancies of parents, teachers and students pull, the more conflictfully the roles of each are played and the sooner the enterprises in which they meet are doomed to failure. Can we learn to read human relations? Are there techniques which will help the role-players involved reach an accurate and sympathetic reading of the other's point of view?

An Action Approach. Three widely separated school areas in California requested the help of a consultant in sociometric and psychodramatic techniques. A workshop in "Human Relations" resulted in one area; in another the workshop was built around "Evaluating Social Skills." A composite description of the programs which emerged may serve to indicate an action approach to parent-teacher-pupil relations.

First Phase: The Sociometric Test. After preliminary discussions of (a) the participating teachers' various class-groups, (b) the behavior of particular children the teachers anticipated help with, and (c) classroom "atmospheres" in relation to learning productivity, the consultant proposed the Sociometric Test for tapping the attraction-

repulsion patterns in each of the classes. Sample Sociograms were examined, and teachers learned to read typical groupings. "Social atoms" of the underchosen, average chosen, overchosen and rejected child were discussed. Instructions for giving the test were tailored to each class-room program. The teachers, in order to test their own abilities as human relations observers, predicted the sociometric status of their pupils and filed their predictions for comparison with test results.

Second Phase: Sociometric Guidance. Teachers, administered Sociometric Tests to their classes. Some also administered a Sociometric Self-Analysis Test at the same time, asking students to predict who in their groups had chosen them; this provided a valuable clue to the accuracy of each child's conception of his own role in his group.

Teachers were surprised at their own inaccuracy in predicting the friendship-patterns of their students. Their reading of the groups was about 25% accurate (7th and 8th grade groups). They were also surprised at the number of rejected and underchosen children in the classes, at the number of low-chosen children making "unrealistic" friendship choices amongst children, for example, who were highly chosen, who were unaware of them in return, or who returned only rejections. One enterprising teacher administered the Mental Health Analysis (Intermediate Series), and compared results with the sociometric findings; she discovered that for the children in her group *low sociometric status and a low mental hygiene score went hand in hand, likewise high sociometric status went with high mental hygiene status. Highly rejected individuals tended to have low mental hygiene scores.* An analysis of the Sociometric Test data followed. Sociograms for each group were constructed, and, as the first step in action-guidance, children were reseated as nearly as possible according to their sociometric choices. Many teachers expressed reservations about whether "giving children their choices," even for working together, would be feasible. They were still reading their own hunches rather than reading their children. But reseating proved "successful" in 90% of the cases; that is, behavior problems tended to drop off following the reassignment therapy. Teachers who found some problems intensified by reseating decided that no arbitrary reseating "for convenience" should be resorted to. They developed the following procedures for handling "breakdowns:" (a) hold a "non-directive" interview with the troublesome pupils about how the reseating was working out for them, (b) give students a chance to rechoose if they ask for it

during the interview, (c) separate seat-mates that still don't "work out" their own problems, but throw them together sociometrically for project work, short term activities and so on. If these three steps failed, the teachers considered two further: (a) test the classroom program to see whether it adequately meets the needs and abilities of the non-cooperating child, and (b) consider the child's suitability for special psychological testing and guidance.

As a further attempt to help the children build security in their groups, teachers kept anecdotal record-cards for each highly rejected or underchosen child. A similar card was kept for those children considered "problems" although they did not appear *sociometrically* insecure. Cards were added or subtracted from time to time, but most teachers began with about ten. On each card was placed the name of the child, the names of his first and second choices, the names of those who rejected him or of those whom he rejected. In addition the teacher recorded dated anecdotes about the students' behavior, his comments, attitudes, absences, work difficulties, etc.; she also recorded *what she did to help the child* in each situation. Because these cards were cumulative, the entries began to tell a story. For example, the card for one child read:

3/2 John came up while I was walking on the playground with other children. He heard one boy say, "Gee, Miss G., teachers sure must have a hard life." John was on the edge of the group, but he made a great show of saying "Oh no they don't!"

3/8 John is absent.

3/15 John came back after a week out of school with illness. After school I found a valentine on my desk which read: "Everybody pushes me around. Nobody loves me. Couldn't you?" I wonder if I have been mis-interpreting John's aggressive behavior in class?

Third Phase: Sociodramatic Exploration: Teacher study still tended to center around "problem children". The consultant began to have the teachers enact the conflict situations they described rather than merely talking about them. This proved rewarding. Not only were a number of excellent suggestions for handling the conflicts proposed, but the teachers, in playing the part of the child who troubled them, seemed to reach a catharsis which then allowed them to approach the problems more constructively. The consultant explained the purposes and techniques of the sociodrama at every

step. Teachers began to ask the consultant to develop sociodramas with their students. He spent a day observing each class first, with the sociometric seating-charts before him. Subsequent conferences with the teachers determined how the sociodramas might be related to the regular work of their classes, and which children were to be "involved". The purpose was to allow the teacher to explore key children "in action". Sociodramas were developed around vocational, travel, family-conflict, and classroom-conflict topics. Teachers were surprised to discover that many children whom they had found "uncooperative" before gave splendid and serious sociodramatic performances. They also got insights into how problems of human relations could be resolved openly through group enactment and evaluation as well as how social skills could be built, through spontaneity practice, by children who needed them. The consultant frequently left the classrom at the end of an hour, and the teacher was left to "take over" an uncompleted sociodrama. Teachers subsequently reported that carrying on was "easy", but that they would never have had the nerve to begin to use the technique if they hadn't begun that way.

Insights not only passed between pupil and pupil during sociodrama, (Boy, after enacting the role of *architect,* his vocational choice: "I didn't know before an architect had to work with *people* so much . I just thought he was in an office.") but they also passed between pupils and teachers. (Girl, after sociodrama session: "Gee, Miss T., I bet if we did that once in a while, we'd get to know one another better. I bet you'd get to know us better, too.")

Fourth Phase: Sociodramatic Guidance: The consultant met with teachers after working in their classrooms, and discussed with them many of their previously unexpressed questions, attitudes, fears and enthusiasms about their students. He assumed a permissive and security giving function because their insights about interpersonal relations were beginning to flow rapidly. Teachers were encouraged to exchange information about ways action techniques were helping them in the classroom. Problems were always studied with the sociometric and sociodramatic data as the objective starting point. As the role-aspects of the classroom sociodramas were discussed, teachers frequently saw new and more positive qualities in the student they had observed before. When the sociodramas had actualized teacher or parent roles, they frequently had insights into the expectancies of the children which had previously been hidden. The final aspect of this phase involved planning specific sociodramas

for retraining key students in situations which would clarify their own conflicts in the group and build appropriate interpersonal skills for their solution. Such a session revolved around a girl who talked too much in class. She was given the role of *chairman* in a sociodramatic school party-planning committee, and after she had portrayed her role in typical dominating fashion, a group evaluation of her enactment emerged. In a re-enactment phase she responded to the suggestions of her group by achieving a better balance of effort in the committee. Situations were planned in which the girl could then exercise her new learnings in real-life situations.

Fifth Phase: Semantic Analyses: (8) Teachers began to be aware of their closer observation of students; they began to see the difference between making statements about children which were "descriptive" and statements which were "judgemental" in character. (9) The consultant introduced, as a mode of intensifying these insights, some examples of such semantic blockages to communication as *silent assumptions, static-outlooks, allness reactions, either-or orientations, signal reactions, identifications, self reflexiveness,* and *stereotyping.* The teachers contributed examples of these blockages from their own experiences.

Examples of Statements Collected by Teachers for Semantic Analysis:

Silent Assumptions:	"She *gave* me a C". (student) "No wonder the boy can't do math, *his father couldn't do it either*". (parent) "His IQ is *only* 102". (teacher)
Static Outlooks:	"That's the way my parents feel about it". (student) "I'm older than you are". (parent) "I had him last semester and he's no B student". (teacher)
Allness Reactions:	"I don't care what you think". (student) "No child of mine is going to smoke". (parent) "We'll do it *this* way". (teacher)

Either-or Orientations:	"I guess I'll just have to behave or get out". (student) "Either I run this family or you do". (parent) "Do this work or I'll fail you". (teacher)
Signal Reactions:	"Quit picking on me!" (student) "Who says I'm old fashioned!" (parent) "Go to the principal's office". (teacher)
Identifications:	"That isn't history". (student) "He's no student". (parent) "He's the blacksheep of the family". (teacher)

Verbal techniques for overcoming these blockages were submitted by the consultant, and teachers practiced their application in sociodramas of conflict which were resolved through the techniques of semantic therapy.

Sixth Phase: Parent-Teacher Participation: The purposes and techniques of the action program were presented to parent-teacher study groups. The participating teachers joined the consultant in "explaining" the experiment. Parents offered many conflictful home situations suitable for enactment and discussion by their children in the schoolroom, and experienced the dramatization of some troublesome school situations in which they took the roles of the children and the children's teachers. At one evening meeting parents, teachers, and students played sociodramas together.

Seventh Phase: Other Schools Participate: Other schools in these communities began to hear about the work being done. They applied for similar workshops, and these were provided. The "bandwagon" was rolling, and "learning to read yourself and others" was the slogan. Here was something teachers could "use".

Eighth Phase: "Relating Techniques"—Something new is discovered. After the teachers had learned to use the Sociometric Test data, and, to some degree, the sociodrama, they concluded that there was still great need for using what we finally called "relating techniques". These were simple techniques for engineering children into cooperative relationships many times during a day. This "relating" was done to encourage interpersonal exchange and, thus,

sociometric growth. Lists of such techniques regularly used by individual teachers were pooled and mimeographed for conscious use by all.

> Example: "John, will you reduce these fractions, and Bob, will you help him please?"

This aspect of the workshop was unexpected, and proved a genuinely creative group outcome. "Relating techniques" were not only a joy to exchange and invent, but they also provided teachers with a means for making more deliberate and more purposeful use of the help-made relationships the students had indicated desirable to them in their sociometric choices.

Ninth Phase: Retesting and Re-evaluating—the Measurable Outcomes. Sociometric Tests were given every six weeks. A comparison of the chartings at two time points showed many evidences of sociometric growth. Such evidence of pupil-gains in acceptance gave teachers a feeling that there was something definite to work for on the human relations level, and their interest in the whole study was thereby intensified. Many teachers reported specific examples of growth in pupils' social skills during sociodrama sessions and of their carry over into more appropriate classroom behavior.

Concensus: The "problem" students seemed to have made the greatest progress, both sociometrically and in the anecdotal records (observation) of the teachers. They decided that their next responsibility was to study and help children of the average chosen status —those who often "escaped notice" because they seem to get along by themselves. To the consultant, the experiment showed an intensification of the reading process all along the line—even, it must be added, in himself.

Theory and/or Practice; Another Relationship which bears Rereading. Considerable writing has been done about the theoretical aspects of sociometry and sociodrama; little exists in print to show the application of the methodologies in a wide-scaled school program. (10) The character of this paper has been deliberate: theory and practice must both concern us.

These approaches have been called action approaches because their exploratory, diagnostic, training, retraining, and therapeutic phases are all focused on the individual *when he is in action;* this fact distinguishes them from the counselling techniques developed by the psychoanalysts, non-directivists, and others who have con-

cerned themselves primarily with the *"cold* material the subject leaves behind" (10) after the interview is over. And because the "material" most frequently analyzed is a record of *verbal behavior only,* a rather partial reading of the subject's total personality results. (11) The action-observer approaches the structure of his subject's personality in the immediacy of his *acts,* and his readings take into account verbal and mimic symbols simultaneously.

Because of the primordial and inclusive character of *the act,* and the highly organized "production techniques" (12) which have been developed in sociometric and sociodramatic research to stimulate and direct the subject to action in his own behalf, the process of guiding individuals and groups to sound communications and productive relationships has reached a new level of concreteness. Much of the pathology of misreading may be expected to yield under such social microscopy; and the reading of *social relationships,* ("our big educational job right now,") may be expected to help us in achieving the broadened educational goals of our day.

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READING OTHERS

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When, in the first years of human development, our far-distant forebearers looked at each other, estimating personal danger or security, they had already learned many of the basic principles of reading others. Without the use of many verbal symbols they "sensed" strength, hunger, threat, friendliness, fear—no one can say how, how clearly, or with what accompanying feelings—but in some simple non-scientific fashion each learned of others as he watched. Often his own continued existence depended upon his accuracy of such reading.

As peoples developed, as methods of human expression became more intricate, as the venturesome wandered farther from home and

met more, less similar, people, this type of reading became increasingly important. The intricacy of such reading was limited only by the experience and intelligence of man himself. Needless to say, when it was not accurate the penalty was not a low mark on a grade card but a real loss of security, sometimes fatal.

To us the serious value of such reading may seem of little worth. We are protected by laws, social customs, widespread social integration, intricate patterns for evaluating people and their behavior. But in those days, untold centuries ago, the ability to read for one's self was essential, a constant part of self-preservation. To know that a given individual was "brave as a lion", "sly as a fox", "honest as the day", dangerous as a "snake in the grass" meant greater ability to protect one's own and one's self.

Gradually the skill in such estimation of personal characteristics evolved as a distinct phase of reading as more complex patterns of living began to appear. No longer did a man live for himself or his family group, but he became a part of fairly well integrated communities and finally of nations. The leader of such a group usually continued in power as much because he was able to read others as because of his own intelligent planning of wars and the administering of justice. He sought those whom he could trust to lead armies, to sway people by argument, to be honest guardians of the crops and moneys.

The adventurer, planning far journeys, sought to read in men the ability to respond quickly in danger, to adapt to new problems, to see and interpret signs, to aim and to kill quickly. The father of a family, worrying over the future, tried to read his children. Which could best be the family head, administer the family affairs with least argument, save and add to that which had been accumulated, after his own passing?

Out of this constant need to read and thus understand others has grown much of modern human understanding as it has been rendered possible by the sciences which are capable of application to human problems, but even before the beginning of any such interpretation people tried to formulate tests or comparisons which would make such understanding possible. Our own fairytales have many such solutions for this need, and the same tendency is revealed wherever a people has even a scanty heritage of folk tales. I am sure most of you have read of the king, greatly troubled about the future safety of his kingdom, who called his three sons together and gave them all the same problem to solve, assuring them that he who

brought the best solution would be his successor. His first task was that each should travel a year and bring back the smallest most perfect thing he could find. The dissolute oldest son spent the year in the expected riotous living and then hurriedly bought a beautiful and tiny replica of a castle in jewels to take home. The second son, earnest, unimaginative, and plodding, brought back an exquisite painting so small it could hardly be appreciated by the naked eye. The third son found an enchanted castle where all the inhabitants were cats who turned into ladies of the court and a beautiful princess before his eyes as he hid and watched them, the first night he was there. He stayed the year and at last he returned home, provided by his princess with a nut to be cracked and given to his father. This he finally produced when asked for his treasure, cracked it, only to find another nut inside, and again another. Finally the third nut cracked and revealed a tiny red satin cushion and thereon a tiny dog, who jumped up and made a bow to the king.

Now the king has read his oldest son as incompetent, and his second son as unimaginative, too ponderously and laboriously literal to understand the people of the kingdom, and his youngest son as more like himself, the one he yearned to name as his successor, but the test was not conclusive; so, rather sad at heart, he gave them a second trial. That, too, revealed the ability of the youngest son whom he wished to name king. But because the resentment of the other two might make things difficult for the youngest prince he assigned them a third test; that of bringing back the loveliest princess, to be a fitting queen. This test actually confirmed his reading of his sons, for the son who spent the year in wild living hurriedly married one of his companions from that experience; the second son brought home a woman as unimaginative and ordinary as himself; the third son arrived with his princess, released from enchantment, beautiful, rich, a princess in her own right of a country that could be united with the king's own. Needless to say the statement of the problem, the testing, the use of further tests when the first did not give a suitable answer, and the marvelously satisfactory conclusion show how much our forebearers wished to be able to read people better than they could.

Our literature and that of other peoples is filled with this idea of tests to further reading an individual or a people. The tests are insignificant but the record of such desire is a significant indication of man's interest in building up some more accurate manner of reading others. Over and over we find these attempts to crystallize human behavior into patterns which can be better identified and

more completely understood. In many instances the concept has become so widely accepted that one needs to mention only a name to be understood, be it Narcissus, Jove, Oedipus, Loki, Parsifal, Portia, Cinderella, Evangeline or Faust.

Not far from such presentations but a great deal nearer to a scientific reading of others is our accumulation of fact and story about those whom we cherish as people who have helped make us what we are today as a nation and as individuals. We treasure all we can learn about those whom we count as great contributors to human advance, explorers, warriors, religious leaders; teachers, statesmen, scientists; philosophers, writers, editors; musicians, artists, dramatists; all these, and many others have been crystallized as patterns of human accomplishment. One needs only to mention, for instance, the vast collection of articles, poems, books, which comprise our library on Lincoln to illustrate what may happen in the effort to read and to understand an individual whose words and actions force men to pause and to think as they attempted to read and understand the mystery of his opportune greatness.

Reading others has two great purposes. The first is purely selfish. The reader attempts to learn something of interest, value, security or advantage to himself. All that he reads is for personal furtherance. We meet this constantly, in all the smaller and greater ways of living. We learn to read in such an effort a measure of the man using it.

But there has developed also, the second, much more significant type of reading which has an unselfish or altruistic type of reading, even though the reader may incidentally benefit, if his reading is accurate. One reads to benefit others, for their good, for the future security or happiness of the individual or the group to which he belongs. Perhaps the mother through all time has best expressed this desire to read another for his advantage and benefit. Selfless, protective, idealizing, she studies and learns to read her child with an efficiency and completeness few other relationships evoke. Needless to say her interpretation of what she reads may be faulty, or myopic, but in spite of such variations the security of human progress has been greatly furthered by her efforts.

Maternalism is a characteristic of many social relationships outside the family. Diverted from the reading of children in the family, or compensating for the lack of such objects, it is to a great extent the source of present day practices in many social efforts. The church, social relief, schools, charitable agencies, and many other types of human service reflect the same effort to read others for

their betterment. Gradually the impetuous efforts made in these various areas have developed certain skills which lie, not in the experience of the individual, but in crystallizations or generalizations, techniques, methods, procedures, which can be passed on to others. These were almost traditions at first, sometimes passed on as secrets of success, sometimes veiled in story or case incident, sometimes a group of "don'ts". All forms led to better reading of human beings and their problems, but it remained for our own generation, our current century, to achieve the first rudiments of an impersonal scientific approach to this whole problem.

Less than a hundred years ago people were still read by the bumps on their head, or the so-called "stigmata of degeneracy." The unusual protrusion of a brow, the depth of the eye-socket, the lack of an earlobe was seriously considered a significant factor in the individual's behavior determinants. There is no telling how many heartaches and failures resulted from the phrenologist's appraisal of bumps and his predictions therefrom. There is no telling how many minor offenders became greater offenders because their crooked little fingers confirmed the opinions about their guilt and gave them penal opportunity for better schooling in more evasive manners and more subtle crime.

Today we know enough about reading others to know how little we know and how much there is to be learned. No one person has given us these skills. They have been a gradual development contributed to by many working in varied fields, with different interests and specialized skills, but with the common desire to know more about others.

Out of these efforts have come procedures which are fully scientific although not as yet fully adequate in many fields. We call these procedures clinical psychology, psychiatry, personnel evaluation, guidance evaluation, vocational guidance, medicine, social psychiatry, educational diagnosis, and many other things as the angle of knowledge about the individual which we wish to acquire varies. No matter which phase of the study of the individual we wish to emphasize, it inevitably led to trying to read the individual and through the facts thus gathered to help him or to modify his relations with others.

How have we learned to read in these less personal, more exact manners? Just as our king in the fairy tale used an objective, identical demand with all of his sons, so that he could compare the results as a measure of the three, so we have learned to use gradually developed and constantly improved procedures which, fortunately

for us, do not require a year to show responses but which do, under similar situations, with identical demands, (called test-directions) ask for specific behavior, within specified time limits. Such demands we commonly speak of as "tests" or, if given in series, as "test series".

Needless to say the test situations vary according to the professional interest in reading the individual then and there. Educationally we are more interested in such techniques as they relate to educational problems and to the behavior of children. But it is wise to remember that similar knowledge of individuals is constantly being read in many other fields. The technician takes a blood specimen and determines that the individual either does not use foods rich in calcium or else his body cannot assimilate it. He takes another test and finds the subject cannot utilize a normal amount of oxygen. The fact may be thrilling to him but to the physician whose profession has taught him how to modify such behavior as read by the technician it is part of the total pattern of learning to know that individual clinically.

The same is true in clinical psychology and clinical education. The response to a test situation gives us a minute bit about the individual. One such tiny item means but little, but two, three, ten skilfully related items mean a great deal and reveal to us some of the attributes of the person studied.

Even so, all such responses would be but picayune in value unless we knew something of the meaning of the responses. When a test is developed it gives us techniques for controlling the environment, the stimulus and, if necessary, the time utilized in making the response. But the ability to read the response is a separate process and requires more than common-sense or a little experience.

Perhaps you can see more readily what the other need is if I indicate it through an illustration. About thirty-five years ago I had the privilege of visiting a clinic where problem children, slow, troublesome or delinquent had been taken for over a quarter of a century for diagnosis and advice. Moreover, I had the privilege of seeing the case records and of seeing how far back the records went. Whether they were typical of most clinics of that period I do not know, but they did serve the public demand of that time. Upon investigation I found the case folders contained a bizarre collection of bits of material. There were occasional letters, a child's drawing, some numbers laboriously written, and many scraps of paper with notations. Usually these bits were without names or dates, and seldom were they signed. The contents were fascinating as far as they went, for example: "walked for the first time on his

birthday", "passed into second grade in June", "has held a job three months", "knows president, coins, family, subtracts, reads newspaper."

But, can you read into these attributes of the individual under observation anything of his actual competency, retardation, acceleration? I could not. The other significant and necessary factor in the use of tests was totally lacking. We need to know the age of the individual meeting a certain standard of achievement, and even more than that we need to know the age at which an individual *usually does* such things. Today we have the knowledge that lends significance to test accomplishment, that is, norms of behavior. A standardized test procedure may be interesting. It becomes significant in reading others only when we know how different people of different degrees of maturity, of different degrees of training, or of different emotional tendencies respond to that test. We cannot tell in any other way whether a test demand is reasonable or arbitrary, too simple or too difficult. With such norms, and with tests rightly applied, we have now many varied opportunities for reading another to his advantage and to our better understanding of him. We can determine how he responds in comparison with his peers, and we can also determine with what age level he more nearly corresponds.

However, even with such standards the clinical reading of another's behavior and what lies behind it is not simple. Many varied factors, differences in health, in experiences, limited environment, less opportunity for formal education, emotional patterns resulting from disturbing experiences, fears, anxiety, love, desire may frequently be expressed by behavior that presents similar external characteristics to the observer.

The child who just looks at one and says nothing, whose face is non-expressive and whose body is still may be inhibited by fear, stoical in a misunderstood situation, filled with rage at being approached, mute, idiotic, deaf, or so completely absorbed in some phantasy that the external world means nothing. One can usually read overt behavior at least with some degree of accuracy, but the non-responsive individual is a far more difficult reading task and interpretations hastily made are hazardous.

It is obvious that reading such a person must rely upon the aids to be gathered from a report of his behavior as seen elsewhere and as experienced by others who have had the care of him. This means that one must seek the history of the individual's previous behavior, environment, handicaps and capabilities. Research should

usually include all possible fields, beginning with the mother's prenatal care and following the individual through the periods of neonate, infancy, early childhood, educational experiences, illness, accidents, and special family problems. Especially needed are reports of any unusual experience or happenings, or episodes of unpredictable behavior on the part of the subject.

Naturally, the value of such data is less than that of direct behavioral observations for its validity depends upon the keen and accurate reading of the individual reporting it and the skill of the one gathering the data.

Fortunately the inaccessible individual is not too common and his history usually gives us some help in reading him. When it does not, only prolonged observation can bring about any true understanding of him. But even if the individual is cooperative it is highly hazardous to depend upon test situations for one's whole knowledge of him when there are so many other fields of information that may be read. Whether test findings seem obvious or are hard to elicit they should always be related to that which may be read of an individual in a report of his past experiences, health, education, behavior and family integration.

Nor may one stop there. Reading an individual psychologically needs to relate all of the past chapters of his life to the present one. His family, its characteristics, its migrations and fixations, its geographic and racial placement, its traditions, taboos and economic status are necessary orientation.

Once gathered, these chapters and the reading of the subject himself have to meet one very important rule. This rule must be followed; it allows no variation from its application. No ITEM WHICH PRESENTS ITSELF IN THE STUDY OF AN INDIVIDUAL MAY BE ALLOWED TO STAND UNRELATED TO AND IN OPPOSITION TO THE READING OF HIM AS A PERSON. All too often careless readers or readers who are myopic, who suffer a strabismic distortion of thinking and reading, who invert images, try to read human beings with disastrous results. One has to read the whole presentation to be fair to the subject, to be fair to anyone with whom he comes in contact. If we understand what we read, all we see will integrate itself into one and only one possible personality, for the personality at any one time is the sum total of its experiences to that point.

Fortunately we have the beginning of a system of identification of some of the patterns or syndromes of behavior. Without some such classification of behavior it would be almost impossible for either psychologists or teachers using psychological aids to identify

the problems of the children they wish to read and to help. Some of these syndromes are now quite well-known to most of us, although the use of their identifying terms is entirely too loosely and indiscriminately applied. All of us have known and dealt with children with inferiority complexes, infantile behavior, mother dependency, escape motivation, compensation trends, solitariness. Often we recognize these response mechanisms upon our first contact with a child. Sometimes they make their appearance but slowly. In all instances they are motivations that drive the individual logically or illogically towards certain types of behavior and block what efforts he may make towards other types.

Reading the syndrome is of tremendous importance for it usually determines a great part of our approach towards the individual, towards helping him. But even then we must stop and read other parts of his personality, learn what helped to develop the syndromes we read before correction may be properly initiated.

There is, however, another skill necessary in the scientific reading of a person. We might say that such reading is done in many languages or tongues and unless we know somewhat of at least two or three tongues what we read has only personal value to us. There is no way of integrating it into that which is known in other tongues but not in ours. We may plan to have a child thoroughly studied and he may be studied by many specialists, but if each of them reads only his own special field of interest, there is no true help for the child. The physician reads a patient one way. Sometimes he is dissatisfied with what he learns and so he asks help from some one else, laboratory technician, roentgenologist, surgeon. Each of these reads the condition from his own standpoint but is able to talk the mutual language of the general practitioner and enriches his reading so that the end result is more adequate and far more certain.

The parent reads a child in one way. The educator reads him in another, the psychologist has another greatly different reading. Nurses, optometrists, oculists, social service workers, court officials, ministers, employers all have their own approach, but if we are actually to know and deal with the child all of these angles of knowledge must be integrated, or any one interpretation may do the child more injustice than would letting him go unhelped.

Clinical psychology now has numerous approaches to this problem of reading people. In general it is accepted that at least three or four such measures must be used to be sure one is appraising a subject properly. Not only that, but the findings from these fields

must be synthetized into one coherent and plausible whole before the validity of the findings may be even assumed. Of course the most common approach to such reading lies in the use of the Binet Scale in some one of its revised forms. Obtaining the mental age of an individual is a first step in reading him. Its use is about as basic as is the astronomer's use of the longitude and latitude of a star which he wishes to study. He locates it relatively. Yet mental age is of relatively little use or importance when one is interested in a child who is adequately meeting all of Society's demands upon him. It is of far more importance when the individual seems to be inadequate in some way or is poorly oriented towards his work or seems to be misplaced. Then it helps us locate him in the right part of the group to which he belongs.

Reading the behavior which has been slow in completing some such test series as the Binet is often of far more significance in understanding the individual than are the mathematical ratings given for the quantitative behavior. The reading of quality of behavior is more nebulous and evasive, but well worth the effort for it often precedes all other findings in importance for true analysis of the problems the subject has presented.

However, there may be no complacency assumed because one is able to achieve certain information through use of the Binet series. This group of procedures, their interpretation, their norms have been built up largely upon the observation of behavior that is verbal in presentation and verbal in the expected response. It is a most unsatisfactory method of studying the behavior of him whose skill lies in *doing,* whose interests are of the earth, earthy. To read adequately and judge fairly the ability of many people means that situations must be used for such standardized reading as will give them opportunity to show their intelligence, in all its principal ramifications and applied implications, through performance tests of adequate variety and difficulty. Fortunately, there are the beginnings of adequate techniques and tests for such study, but unfortunately there is entirely too little recognition of this phase of ability in our schools. Schools began largely as the privilege of the few. They are still the cross of many who are far better members of the social organization in which we live than those who respond with facility to their standards. We must remember that people lived and worked and died for untold eras before the reading of symbols became a criterion of superiority and we must do all we can to replace the emphasis on mere reading of symbols with an emphasis on the true reading of human values.

It is no unusual experience for the clinical psychologist to find a lad who seems rather hesitant and over-deliberate on all tests using verbal symbols but whose performance on situations demanding actual manipulation of objects, with reasoning, planning, adaptation, speed and manual dexterity enables one to read clearly the potential competency that lies below the test responses. On the other hand, it is no more unusual to find a child whom the mother or teacher protectively excuses because of change of schools, a bi-lingual home, or illness who shows by his behavior on the same sort of unlearned test situations that there is a basic handicap that much more fundamentally affects his whole personality and his thinking.

Both Binet and performance tests are but primer efforts in the reading of human personalities. They give, to the trained reader, some concepts of the relative ability of the individual read. They give, however, but relatively little of the motivations to behavior, the surcharge of feeling, the stress of desires, the paralyzing terrors, the pressure of past experiences morbidly remembered, nor the emptiness of those whose experiences have been restricted and over-dominated. It is necessary to read beyond the one-syllable text to obtain even a few indications of the inner life of an individual as it forms an ever elaborating composite or shatters into meaningless bits.

Tests and technics to help one read these phases of human behavior are being gradually developed. The Rorschach and Thematic Apperception Test are so far the most widely known of these. They, like all truly worthwhile aids to reading others are simple, yet of intricate interpretation, variable yet constant, and have unexplored potentialities for human service. Like many media for the gathering of data these tests, practically all tests, are used as badges of personal validity and accuracy in reading people, although the claimant may be but the most superficial scanner. But one no more blames the test technique than he blames a good camera for poor photographs which sometimes result from amateur attempts. The Rorschach is somewhat like a camera, or perhaps more like an X-ray machine, catching fluid pictures of a mind's effort, of the total personality striving in pleasure or despair to respond to this unknown situation. The Thematic Apperception Test reveals more directly the individual's habits of feeling and thinking, his integration of past experiences and attitudes into habits of comprehension and interpretation through which, or with which, he reads the situation presented.

To read through the use of either of these techniques is to enter into close rapport with the subject. One may read and understand with only good resulting to the one read, or one may violate crudely the very integrity of the person studied. This depends entirely upon the reader, his aims, interests, philanthropy, as well as his scientific skill.

Just what does such reading do? That, too, depends upon the reader. If cases are partially read to form a hurriedly thrown together thesis, the reading can do only harm. It belittles the importance of the subjects, ignores findings that might have been of value to them in daily living, and builds into the world of symbols another superfluous and partial volume which of necessity must be considered by all later workers in that field.

If the reader be honest but conceited, satisfied with minimal effort, the subject suffers, perhaps permanently. He who can read an individual by the Binet, for instance, and assert that there is nothing wrong with the subject without considering all the other facets of his living, feeling, experiencing, may do untold wrong. College may be planned on such an inadequate basis, school may be discontinued, responsibility may be placed upon shoulders that cannot carry it. There is no way of knowing unless, at some later date, the consequences form part of a new problem and are revealed through more thorough study.

On the other hand the individual eager to help, eager to further the stability and integrity of others may well achieve tremendous things with even a little sympathetic reading. Not all people need intensive scientific reading. To many the sympathetic reading of a few of their problems is of enough value and comfort that they can go on into better living and happier doing. Needless to say, the more one knows how to read the more any reading he does will be of value.

Out of our experiences with the effort at scientific reading of others there seem to develop certain principles which are worth considering and even pondering.

First, no one should rely upon his reading of others until his own vision is direct, unblurred, and adequate. Figuratively speaking neither smoke-grey lenses nor rose-colored ones should be used to ease the reading.

Second, the reader must be able to understand what he reads and not interpret it with personal bias or narrowness of perspective.

Third, the reading must be of wide range, covering all aspects of the subject's problems.

Fourth, the reading must be done with a receptive but critical mind, unharried by the reader's own emotional problems.

Fifth, the reader must be truly interested in others. Narrowness of party, creed, race, and interest must not distort the pattern.

Sixth, the reader must be ready to follow reading with commensurate action, if the situation needs action; to use sympathy, when that is indicated; to do nothing, when that seems best; to admit inability to understand, when that happens.

Seventh, the reader must approach the reading with a true interest in human kind, without any sense of superiority, with patience and a desire to serve humankind.

ELEMENTARY READING FOR PARENTS AND TEACHERS

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The administrators of a Junior College decided to require a course in human relationships of all students whose high school marks were too low to admit them to courses leading to a college degree. It was assumed that they were doing their terminal work in schools, that most of them would marry, and that the schools had an obligation to give whatever help it could to make the families of that generation stable.

The fact that the course was required was the first hurdle for the instructor; the second was that it was required only of non-recommended students, and even before the first meeting of the class it was known as a dumb-bell course. The instructor set up a third hurdle by requiring the purchase of a textbook that cost $4.50. One hundred twenty-five young men and women were in the seats on the day of the first meeting of the class. When the bell rang for the opening of the class period, many of the young men were sitting on their sixth vertebrae with their feet on the back of the seats in front of them. Every one continued to talk so gaily that the instructor made no effort to interrupt, rather she attempted to read what was going on. After a period of "silent reading", by the instructor, the talking stopped, and the instructor said, "We are

constantly revealing ourselves", and then waited as long as was necessary for each member of the class to get his feet on the floor and to assume a normal sitting position. There followed consideration of ways of expressing the self—the kind of self to be expressed, and the understanding of other than verbal expression.

Semantics has been given wide attention during recent years, to the benefit of human relationships. Accurate reading of non-verbal expression bids fair to make even greater contribution to individual and collective happiness. Here, too, what one brings to the reading contributes as much to the accuracy of interpretation as the thing to be read. This kind of reading is a dangerous undertaking. But it is also dangerous not to learn to read, and to take the risks involved in misreading. The major danger is that the sureness that often attends partial knowledge may cause us to injure others. We may be sure we are right in our reading, although we may have been insensitive to the subtle signs that are the determining factors in a given bit of behavior. Like other kinds of reading there is need for time, for practice, for correction, and patience. We can well afford to recall the wisdom of Dr. Junius L. Merriam when he pointed out in his book so many years ago that doing nothing is the best thing to do, in instances which are too complex for full comprehension. It is hard for some of us to realize that we are really doing something when we "do nothing" in relation to another person; doing nothing may be the most potent thing that can be done. Doing nothing, however, should always be the outcome of considered judgment—an expression of real care. How shall a basis for judgment be built?

Dr. Edith Jackson, associate clinical professor of pediatrics at New Haven Hospital has emphasized the proper timing, sequence and degree in the application of controls and restraints. How shall a parent or teacher know when to apply controls and restraints to a particular child? How shall we know the sequence to use in treatment of behavior? How shall we know how severe to be with each one? In part by sensitiveness to subtle, often ignored revelation of the feeling of those whose needs we seek to understand. In part by willingness to renounce authoritarianism with its ego satisfactions. In part by familiarity with what has been found out about variation in the meaning of similar behavior in different individuals. Let us assume for instance that four eight year old boys lie about an experience in which all are involved. Let us assume that they all deny participation in a forbidden experience.

One may lie from actual fear of punishment involving physical pain. Another may endure physical pain with fortitude, but be

unable to risk the disapproval of the other boys. Another may be unaware of either of those two fears, but acutely aware of the effect of being found out upon his standing in his own family. The fourth may have none of the restraints of the other three, but may be too dull to make any judgment of his own, and takes his cue always from the way others behave. He may even be too dull to feel much disturbance either of triumph or defeat from any of his own conduct. It is obvious that timing, sequence and degree of application of controls and restraints for these four boys should be different. It is a wise adult who can read fast enough, and accurately enough to make wise decisions in relation to timing, sequence and degree of application of restraint even in simpler situations than the one just described.

Many parents and teachers attempt to spare themselves the discipline involved even in elementary reading of others by making rules for the regulation of the conduct of all alike. Often the rules are made by the adults themselves and are imposed upon others without their consent. Such rules may never be accepted by those whose conduct is supposed to be regulated by them. Unless the learners are utterly incompetent the only general rules that have any value are those that are made by the ones that are to be controlled by them. It is quicker, and simpler for the adults to make all rules, and to see that they are obeyed. Time and patience, as well as ability to read the need of every individual to belong, and to participate in making conditions under which he lives are necessary to the longer, slower process of involving children in rule making, which in larger affairs is called law-making.

Unless we learn to read below the surface behavior we may be grossly misled, and make mistakes in timing, in sequence and in severity. We are more likely to read below the surface if we know the early childhood experience of another. Dr. John C. Montgomery has said that as an individual's consciousness of himself as an individual gradually emerges, he seems to retain a memory of whether or not his comfort was maintained by those in direct contact with him, and perhaps more important, whether or not his discomfort was relieved. Such memory has nothing to do with words, but acts nevertheless as a basis for behavior. There was a period in which doctors recommended a rigid schedule of feeding, sleep and elimination for babies from the first day after birth onward. Babies were placed in cribs, denied all the cuddling that adults tend to give spontaneously to the young. The development of psychiatry has placed the finger upon that practice. There is a growing tend-

ency to subscribe to self-regulation with reference to those major concerns of infancy. Indeed some of the doctors say that the development of what is known as patience comes earlier in children who are on a self-regulatory schedule, than to those who are on rigid, artificial schedules; and that patience is related to confidence.

All this is in support of the contention that the only general direction parents and teachers can use is that we must know all that has been found out about growth in general in order to read the individual's expressions of need. Failure to keep accurate records of individual experience in early childhood leaves the typical parent and teacher to the mercy of elementary reading of signs. We neglect such reading at the peril of mental health.

The most important reason for existence of parents and teachers is to give help to others in the major experiences that should be anticipated for every typical individual. Management of triumph and defeat; accidents and threats to health - death; entrance into schools; church affiliation; getting along with people who are different from the self in sex, age, race, or economic status; earning and spending money; choice of a vocation, marriage, parenthood; are examples of major experiences. In all these important matters elementary reading by parents and teachers is vital, for the timing of help is of critical importance. In almost all education that really matters, help is individual. It has been said that a talk at the right time—with the right person would prevent many cases of serious maladjustment. Parents and teachers may be familiar with a general time schedule related to growth needs of children and in their eagerness to have each child conform to that schedule do irreparable injury to him. Parents tend to feel insecure if a child does not keep time with walking, talking, cutting teeth and control of elimination. Teachers feel insecure if the time schedule for learning to read is violated. Children read the feelings of insecurity in adults that may never have been put into words, and are affected by that reading quite as much as they are by the words of reassurance that the parent often speaks in reply to the puzzled question, "What's the matter, mother?" Measuring a particular child against the characteristics of a whole group of children is as harmful as comparing one child with another. The important thing is to be able to observe the behavior of each child in a way that will help to understand how much children in general are different from him—rather than how much he is off schedule. Sequential studies of children's behavior merely give to parents and teachers an insight into *what to notice* at different ages.

Recurrent periods of relative disorganization as a child's emotional complexity becomes deeper and wider are difficult for parents and teachers, but more difficult for him. The security parents and teachers are likely to feel in cases of acceleration is as false as the insecurity they feel in relation to so called retardation. What kinds of experience does this child take as a problem? What kind of experience does he take as an opportunity? What evidences are there of energetic growing body and mind? What methods is he developing for the management of other people? What makes him do what he does? What happens inside him after he has done it? Why do emotional difficulties get into the way of children who learn intellectually without too much effort?

The answers to such questions are in each individual, and can be read by those who see when they look, and who hear when they listen. This kind of elementary reading, like reading from the printed page, involves both seeing and hearing but not necessarily the use of words. They are not questions to be put to another person, but to be asked of one's self in order to give point to the reading of the behavior of others. The rebuffs that children from infancy on, give to adults as well as the rebuffs that adults give children are important experiences about which questions probably can't be asked. Much of our conduct is prompted by drives of which we ourselves are unaware, and when questioned about it, we cast about for motives that are creditable, and thereby strengthen the habit of rationalizing our behavior rather than understanding it. Indeed the practice of questioning others about their motives, or their conduct is not fruitful as a basis for accurate reading. Questioning others about their motives is for use only by illiterates. It is far more important to learn to be comfortable with the behavior of another even when it can not be understood at the moment. A feeling of helplessness before real or imaginary dangers often arises before an individual is himself articulate about it. To those who know how to read, the behavior of others may be logical, however inconvenient for adults.

Finally it is necessary to keep in mind the fact that the goals that parents and teachers have accepted will color their reading of behavior. Acceptance of control over the physical aspects of life, achievement of beauty in living and high moral purposes are regarded as the goals of experience; the reading of meaning into behavior will be different from the meaning that would appear to an observer who has accepted obedience to authority, material possessions, and sensuous enjoyment as the ends to be achieved.

The reader who is a perfectionist will read in a very different way from the one who subscribes to a growth and development point of view and is concerned with the direction and fact of growth rather than with the momentary perfection of performance. The reader who looks ever backward to the excellence that is partly fiction, reads differently from the one who looks forward in an effort to discern the demands that will be made upon people who are now children. The reader who is himself beset by fear and anxiety reads different meanings into behavior from the one who is confident and buoyant. The one who has the habit of basing conclusions on bits of disparate data, rather than upon well organized accumulation of relevant data will be a "poor reader." Without skill in reading others an individual is handicapped as a member of a family, as a worker, and as a citizen. It is a kind of reading children often do better than adults. As we learn to dissemble we lose the skill to read the conduct of others, even of ourselves, and have to learn through research to become as a little child.

Division II

Reading Personal Factors Which Affect the Reading Process

"How many teachers of reading are able to sense in any given child the intensity of his learning, the vividness of his experience, the depth of recall and the connotative associations he brings into action from smells and tastes? A child's world teems with odors and savors he brings to interpret the words in his books and the broader reading of experience of which print is but a part."

Malcolm S. MacLean

AKRON, OHIO

READING PERSONAL FACTORS WHICH AFFECT THE READING PROCESS

INTRODUCTION

A consideration of "personal factors which affect the reading process" may tap a great variety of things. The concept that persons respond as wholes and that whatever affects any part of a whole affects the entire whole leads inevitably to a consideration of many factors. Since so much of instructional emphasis is directed toward the use of seeing and hearing, it is natural that visual and aural factors which affect the reading process should be emphasized. Drs. Davis and Ilge discuss the problems of the maturing of the vision process, of its measurement, and how vision may be developed. The observation that certain deficiencies with vision are found more often among those who poorly read printed words suggests that schools might well consider such things in conjunction with provisions for instruction.

Dr. Morrison's discussion of "Visual Skills and Visual Training" is reprinted from our eighth yearbook which is no longer available for distribution. Modern views of vision education are so suggestive of valuable practices in developing visual reading that we wished this article to be made currently available. Special services for vision have incorporated much from the fields of psychology and education. They are no longer limited to the physics of optics or to physiological treatments.

So-called "lip reading" is a special type of reading act. Probably all persons with the necessary visual abilities read the facial and body characteristics of those who speak. However, the major concern of those who teach "lip reading" as such is that of assisting the hard of hearing to comprehend speech via the visual sense.

Hearing "conservation" is an obvious aspect of regard for the sound sense. How a county-wide program in that regard has been developed will prove suggestive to others. Aural Education is even less developed than is Vision Education. The future holds great promise for development in these fields.

Untold pedagogical effort is expended on pupils who should first be made educable. Dr. Cavanaugh has described how physiological

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factors play their roles in learning. When we are able to read such factors and to remediate them effectively, learning will be greatly facilitated.

The timeliness of Dr. Mac Lean's message re: a "Multisensory approach to Reading" will be readily recognized by those who believe that reading is more than mere responding to printed word stimuli. "Many senses make more sense!"

"You Must Relax" is the title of a book for teachers. Tensions play a very prominent role in the relationships in our society. Mrs. Frostig suggests the use of rhythmics as a device for alleviating emotional tensions and developing better "social reading."

READING THE VISUAL ABILITIES OF CHILDREN

Louise Farwell Davis, Ph.D. and Vivienne Ilge, A.B., O.D.
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In discussing "reading the Visual Abilities of Children" we can cover only certain areas of the field at this time. We know, as educators, all too little concerning even a child's general development, let alone knowing about the development of a specific aspect such as his visual skills. Those who guide children need pointed suggestions from vision specialists not only to broaden the scant knowledge we have, but also to put into action in our school administration and teaching some policies which will aid children better to develop and to utilize their visual abilities. It is hoped that through conferences such as this, in the field of reading, that more adults can be aware of good visual development as well as of anomalies which sometimes occur with the vision process.

In our visual testing of children the examiner aims to encourage verbalization as various test cards are used. We have found that even five-year-olds are good reporters. It is quite amazing how accurately young children can portray to the examiner what letter is being seen even though the name of the letter is not known. Children will even report differences in what is observed first with one eye and then with the other. It does not seem to enter their thinking to prevaricate as might be the case with some adults.

Occasionally primary grade pupils are asked to spell out letters that they see printed on a test card. On one line of the Snellen Chart the capital letters PTER are often referred to as "Peter".

Another aim which we have in our visual testing is to accumulate valuable hints concerning the child's use of vision. We know that what a child does makes sense. If we notice that one eye is invariably closed during the examination, or if the head is noticeably tilted so that the right eye can be used more in seeing than the left (or the reverse), if a child squints in order to see better, if he frowns, if his head turns as he is asked to follow a slowly moving light while the light is moved in various directions—all of these observational notes are of value.

Another purpose is to tie in any or all testing results with observations which the teachers or parents may have made. We feel that positive visual patterns should be established as soon as possible in order to prevent if possible later difficulties in school learning, inadequate playground skills, clumsy participation in sports or awkward bodily movements while working with tools, or engaging in household tasks.

It might be well at this point to describe our school, National College of Education in Evanston, Illinois. We have 280 children enrolled from the nursery school through the eighth grade. These pupils come, for the most part, from upper middle class homes. Many parents are professionally trained and certainly a majority of the enrollees have most of the privileges needed for comfortable living. The average intelligence quotient hovers around 120; close to 14 per cent of the children have gifted minds. We are proud of the fact that between 65 per cent and 75 per cent of the grade children are up to average or beyond in their achievement test scores. They have consistently responded well in silent reading tests, English, history, geography and arithmetic reasoning. We have the usual number of pupils not achieving according to expectations (from 10 per cent to 15 per cent). The Guidance Center, a separate building to the main school, has a staff equipped to diagnose, plan and administer therapy to those requiring temporary assistance. If emotional tensions are closely tied up with inadequate learning skills, there is a longer time needed to correct learning skills and change attitudes.

We also are a teacher education institution having close to 380 college women coming from practically every state in the Union and later teaching in as great a variety of states. About half of our

college group live in their own homes in neighboring suburbs and about half reside in our dormitory.

We have an adequate initial testing program for both the College and Children's School enrollees. This examination includes a medical check-up, intelligence testing and achievement appraisal. During this year, 1947-1948, a more detailed visual test has been given than ever before. All of the children from the first through the eighth grade have been given a complete visual analysis.

We are equipped to give visual training to either individual children or adults as we have over a period of the past eleven years and have recently carried on research studies using the tachistoscope as a means of group therapy. More will be said of this later.

In our testing to determine visual development we include several items to measure visual keenness or visual acuity. The right eye is tested in contrast with the left or with both eyes together. Near point vision is appraised as well as distant vision. We are anxious to find the naked visual acuity of individuals, i.e. his or her ability to see small type without the use of any lens correction. We also want to determine how much tolerance an individual has when lenses are used. The Jaeger test card with varying sizes of print has been selected for what we term a "push-up" test. A ruler is placed at the bridge of the pupil's nose with the outer end of the ruler extending toward the examiner. As the printed card is first moved toward the child's eyes the examiner requests him to report blurred print. As the card is moved away from the child's eyes he is asked to tell when the print has cleared. The line 37 M is generally used. The small child responds better when it is suggested he look at one word such as "was" instead of the entire line. In considering an ideal response we feel that if the print does not blur until the card is two and one half or three inches from the child's eyes his record is seemingly good particularly if he again sees a clearly printed word when the card is moved back one half inch.

One very good reader in second grade experienced blurred print when the card was only one inch from his eyes and reported the blur as clearing at three inches when using either eye alone but at two and one half inches when both eyes were responding. Another exceedingly fine reader reported blurred print at two and three quarters inches but the print cleared again at three inches. These two children were considered by the teacher as the best adjusted children in the room—a more important characteristic than just being a good reader of printed words. One of the poor readers reported blurred print at two and one half inches but did not see the

print clearly until the card was four inches away. The poorest speller in one primary room did not regain clear print until the card was moved back to four inches. This test is one which teachers can easily use. The Jaeger card can be purchased either from the American Optical Company, Bridgeport, Connecticut, or from Bausch and Lomb Optical Company, Rochester, New York. It is very important to record the nature of a child's facial contortions or any unusual bodily posture as he responds to this test card.

Another type of test in this complete visual analysis is called a test of depth perception. We use the DB6 and DB7 cards as published by Keystone View Company, Meadville, Pennsylvania, or the Wirt Stereotest distributed by the Three Dimension Company at 4555 W. Addison in Chicago, Illinois. Depth perception, as you know, is an ability aiding spatial relationships. One needs depth perception to park a car, land a plane, see the precise location of a clothesline, etc. A child needs depth perception when roller skating, when catching a small ball, etc. In some instances very clumsy individuals have been found to lack depth perception. Also, if a five or a six-year old descends a stairway using both feet on each stair, he, too, might be lacking in depth perception. We do not expect a great deal of skill from young children but after ten years of age considerable depth perception is needed if playground skills are to be well developed. Poor table manners are often characteristic of children who lack depth perception. Our present first and second graders are fortunate in the fact that a high percentage test well in depth perception. One pupil who has the lowest score for our first grade in the reading of printed words is minus this particular skill and is unusually clumsy. Several years ago when we were giving tachistoscopic training to first graders, the three children at the end of the school year with the poorest scores in reading printed words had no depth perception. We realize that no conclusions can be drawn from such limited data. We are merely stating an interesting observation.

A third test has to do with balance or positional coordination between the two eyes. The technical term is phorias, or positioning of the eyes when they are dissociated. If while a child is using both eyes in examining details in an interesting picture, a teacher will cover one of the child's eyes temporarily, upon uncovering the eye the teacher can observe whether the child has a marked tendency to swing that eye inward or outward to regain coordination.

Using a test of this kind to determine positioning of eyes might reveal the individual who is using extreme effort to maintain binocular seeing, i.e. the use of both eyes. The child who positions his eyes in toward the nose is esophoric. He is very apt to be a fatigued person, who can apply himself during close work for five or ten minutes. Then he is likely to become hyperactive, wishing to roam around or to visit with some classmate or have an excuse to go to the toilet.

One of our girls in the second grade who is not achieving well in reading printed words obviously needs lenses, training, or both, to aid her in more correct positioning of her eyes. She might be far more successful if she had training in what we call basic skills, that is (1) being able to follow well a slowly moving light and (2) seeing distant objects clearly after examining details in print or in a picture placed sixteen inches from her eyes. If this pupil had better visual skills her eyes would be less of a handicap to her learning. Incorrect positioning of her eyes would not be as serious a problem as it now is.

Two children in our first grade are inconsistent in their responses to tests of phorias. We know that as we live day by day we vary in our positioning. It is a well-known fact that a man at sea who is frequently looking at distant points can improve his vision very markedly with this long distance seeing. The reverse can also be true. If someone is doing a great deal of close work, the results of this activity can shift the visual test findings. Board work in classroom teaching is to be desired. When children work at the board they should stand almost at arms length rather than maintain a position too close to the board. When the teacher writes on the board we suggest that her handwriting be quite large and that plenty of chalk be used so that children sitting in the middle of the room or farther back can look with ease at what is being written. Teaching via film strip will be of real benefit to children who should use their eyes more at distant work than at close range.

Still another test is that of fusion range. As you know the brain fuses images from each eye so that single vision results. We like to measure this fusion range for both distant and near point seeing. The testing situation actually forces one temporarily to see double. The examiner is curious to find out how rapidly the testee can return to a single image after the stimulus for seeing double has been removed. We should not expect too much from young children but if older children or adults have

a low fusion range the vision specialist often suggests a simple corrective practice, viz. that the pointer finger of one hand be meticulously followed by the eyes as it is moved away from the nose or toward the nose while maintaining single vision. Occasionally a person's brain suppresses vision in one eye so that the single image seen is a false one. That is, only one eye is used in seeing the moving finger. Another individual might not be able to *hold* a single image as the finger nears the nose, i.e. approximately three inches distant. The purpose of this exercise is then to develop abilities to keep the two eyes coordinated as they follow the finger movements away from and toward the nose.

In our careful testing of children in our elementary school we have found very few individuals who suppress vision. In fact we have a low percentage of any single organic defect but many students have been found with functional anomalies.

Another important test gives us a subjective estimate of the child's motor control of eye movements, his pursuit fixations. How well does a child follow a slowly moving light? We use a flashlight bulb which is free of the top and lens metal container. As a child is requested to follow this light, we observe whether he sits in a relaxed manner or whether he or she is posed as a mid-Victorian lady. Is the head constantly moved? Does the tongue wiggle around inside the mouth? How much effort is involved? What report is given? As the child follows the light, the teacher or adult watches the reflection of this light in the pupil of the child's eyes. When the reflection is not centered in the pupil slightly toward the nose, the child is not accurately following the light.

One poor speller in one grade followed the light haphazardly. The reflection was near the top center of this child's pupil — never in the center toward her nose unless urged. We wonder if she actually fixates directly on words that she is attempting to learn how to spell.

The best reader of printed words in that grade has very free movement in following a light. Another excellent printed word reader had a difficult time holding his head still but his eye movements were free and he followed the light better with both eyes than with either eye alone. Some of the poor readers of printed words have been found to follow a light with excessive effort.

Young children are not expected to have perfect control of eye movements but their freedom in following and their state of re-

laxation, their control of head position appear to be characteristic of many of the better achievers. If a child follows well in the left to right direction he very likely reads printed words consistently from left to right with few reversals or repetitions but if he follows poorly from right to left he may skip lines.

Another type of test is one in which we check the individual's ability to shift focus. We use the Tel-Eye-Trainer (Keystone View Co.). Targets are placed in front of each eye and the child is asked to identify details. An alternating flasher device is then started and the child is asked to report if either side becomes less clear than it was in the beginning. A minus lens is then inserted as a handicap in front of one eye. If the child reports that both sides clear it is switched to the other eye. The lenses are increased up to —5.00 or until the child reports a blur that will not clear in the time allowed (three seconds). Some children will spontaneously report that the lens makes the target change its apparent size and place, if not we ask questions beginning with a —2.00 lens. A minus lens should make the target appear smaller and closer. It seems that development in other aspects of visual skills takes place when a person not only can shift focus well but when he is definitely aware of these differences in size and place. Certainly, the individual who can shift his focus readily does not fatigue as soon as those who do not have this ability. One can well imagine the difficulty which would be experienced in looking from the board to desk work if one could not shift focus rapidly and easily.

The question of eye dominance should be considered in this discussion because frequently if a child is preferring his right hand but left eye, or the reverse, the neurological tracks might not be as well developed as if he preferred right hand and right eye or the reverse. When reading material of identical length and of similar difficulty is read first with one eye, then with the other, and then with both eyes, it is surprising how varied the records can be. We often have evidence of very poor binocular skills when for example with the right eye the errors made by a child total ten; with the left eye nine, but with both eyes sixteen. Very frequently the poorest record for reading printed words results when the child reads with his preferred eye (say right). If this preferred eye does not agree with the hand which is preferred (left) we often suggest that the preferred eye (right) be covered temporarily with a patch so that neural connections of the nonpreferred eye (left) and the brain may be strengthened through practice. The left-handed child seems to respond to a left to right direction better if his paper is slanted

in line with his arm and placed to the left of his left shoulder. He should be encouraged to write toward his body. If the book is held opposite the left shoulder the left eye is forced to work more consistently from the left to right. Since the left eye naturally looks toward the right first, the child preferring the left eye has to be more definitely trained in seeing from left to right.

We wish that more children could learn to read with steadier eyes. Far too many constantly shift their eyes hither and yon and see little during this constant activity. How much better it would be to look steadily within the margin of the printed page until all possible words are seen before changing one's fixation farther along on the line but within the right hand margin.

Children and students who have had tachistoscopic drills (short exposure time of one, one-hundredth of a second flash) seem to have this ability to look steadily at one thing. The signal of "ready-now (flash)" as each child faces the screen, trains in rapid seeing. One's attention span is increased because the time for seeing is so very short. Rapidity of response is stimulated as well as accuracy. It is challenging after a kodachrome has been flashed two or three times to find out, when the picture is set on "time," that many of the first observations made were correct. Also, if one sees and correctly records an increasingly larger number of digits, the success is pleasurable because one realizes then that eyes are truly aiding.

Our present fourth grade group had tachistoscopic training both as five-year olds and six-year olds. They resumed this biweekly training in third grade. Many scholastic records in this group are as high as we care to have them, playground skills are unusually good and only a few do not spell well. Many of the senior kindergarten children of 1947-1948 are well-trained visually, for their level of tachistoscopic responses is definitely advanced. We expect excellent returns from them scholastically in their grade learning. We feel assured that many of one's negative visual skills can be better compensated for if the eye-brain mechanism is working smoothly, rapidly, efficiently.

In this discussion on visual abilities we have endeavored to describe some tests which give a good estimate of a person's visual keenness at both distant and near points; his depth perception; positioning of eyes; his fusion range; the motor control of eye movements; and his ability to shift focus. We also showed how dominance can be a negative factor for some children. As we proceeded it was suggested that careful observations be made of children in their use of eyes because what children do makes sense.

Specific suggestions included in this paper have covered informal tests which teachers might use. The results could be good evidence to report to a vision specialist. We need far more emphasis on testing visual abilities with cards or tasks set within thirteen to sixteen inches from the eyes. So many children in our elementary school are naturally so farsighted that their visual problems during close work are not apprehended. One of our best ways out of a serious nation-wide predicament of a high percentage of students with normal minds who are not developing sufficient abilities for reading printed words and the requisite spelling skills for successful learning is to first procure the professional interest and aid of a competent vision specialist. Secondly, from our research at National we feel, too, that when tachistoscopic drills are given to five-year-olds and six-year-olds more children are started on the road to academic success than with any other method of a visual nature which we have tried. Emotional snags in later life should be lessened if one has been successful in his or her early school learning, if he or she has been skillful in playground activities or has been successful in shop work.

Lack of adequate visual skills is not the one and only reason for slow and laborious learning, but it can be one of the many factors negatively affecting an individual child. The basic visual lacks are usually functional. They are rarely organic. Some children have come to our attention who are actually not able to learn from visual approaches but must learn via the kinaesthetic and tactile senses as they simultaneously have therapy to correct their visual discrepancies. However, with many approaches keyed to success levels they do learn and are not merely sitting in a classroom day after day, becoming more and more discouraged.

Have we added some ideas and knowledge to your thinking on this subject? Have we convinced you of the need for more study? This largest handicapped group in America would appreciate your sincere efforts to aid them.

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VISUAL SKILLS AND VISUAL TRAINING*

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From man's earliest existence, he has been in constant struggle with his environment. How to adapt best his methods of living to survive, has been his greatest problem. To enable him to compete successfully with the other living beasts, nature gave to man the

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very best she had to offer—a superior nervous system. With this, man, with his limited strength and inadequate armament, has been able to conquer completely all other factors in his environment. Intelligence has been the panacea that allowed man to subjugate all other beasts, insects, diseases, and space.

Man's senses, although not as perfect as can be found in isolated cases, are as a group, highly superior to those possessed by any other species. Some animals have better sense of smell and hearing, insects have greater strength in proportion to their size, and many birds have superior distant vision. None, however, possess an individual average of all-around sense superiority.

To remain in contact with his environment, nature gave man five senses. In increasing order of importance, they are: Taste, smell, touch, hearing, and sight. Throughout the years that have passed in man's climb toward a higher civilization, the importance of these, with one exception, has remained about the same. The one sense to which higher civilization has meant greatly increased usage, as well as much more complex adaptations, is the sense of sight. The uses to which this sense is put and the efficiency of those efforts are known collectively as visual skills.

Compare, if you will, the original man using his eyes to locate game, kill that game, and use it for food and clothing, with the average student of today first looking at the blackboard, then to a book. The student is using his eyes in a highly artificial way, in attempting to interpret, quickly and accurately, the artificial symbols he is seeing.

As civilization has advanced, man's visual skills have changed from essentially simple far-point vision to critical near-point seeing. Evolution is a matter of millions of years. Yet this change has taken place within the last two centuries and been greatly accelerated in the last two or three decades. Is it any wonder that we have people unable to cope with this rapid change of environment? Is it any wonder we have eye trouble, nearsightedness, or reading difficulties? Is it any wonder we have scientists, teachers, laymen, all intensely interested in visual skills? Through this study man can practically trace his efforts to adapt himself to a thing he has created—a near-point habitat for eyes functionally developed for far-seeing only.

Visual skills can be broadly defined as the interrelated components of the complex act of seeing. This includes all factors of sight, from the light entering the eyes until the final interpretation by the brain. Because of this, it is usually divided up into two sub-headings: Functional and interpretive. The functional phase

of seeing includes all physical and physiological processes set in motion as the light enters the eye, becomes nervous energy, and is transmitted to the brain. Interpretive visual skills involve the interpretation of the nervous impulses that come to the brain.

Visual training is defined as any or all techniques that train the eyes for effective performance of a visual skill. It does not matter whether the training is for the original development of visual skill, or the correction of a visual skill. Remember, that when we speak of visual skills, we mean all phases of seeing. Thus visual training also includes the training of the interpretation of what is being seen.

Therefore, not only specialists in visual efficiency, such as myself, are interested in visual skills, but also psychologists, educators, social workers, and practically all persons who have the necessity to teach anything to anyone. Which phase of what belongs to whom, we won't attempt to answer in this paper. Be it sufficient to say that the problems of one are the problems of the group. It is necessary that each comprehends enough about the other's field to understand intelligently the why's and wherefore's of his own field. It is only by the intelligent coordination of all phases of visual training that satisfactory results or concrete knowledge can be crystallized for the benefit of humanity.

In common with all other habits or reactions, visual skills must be divided into two phases: 1. Primary visual skills; 2. Secondary visual skills. The primary skills are those reactions that are inherited and are instinctively done with no element of learning involved. Secondary visual skills are those skills which represent habits learned by repeating the same act over and over until it practically becomes instinctive. They are usually formed by the combination of primary reactions in a definite pattern.

The primary visual skills consist of the three elements involved in seeing—physical, physiological, and psychological. The physical phase of seeing is that phase during which light radiates from the object in space and enters the eye and impinges upon the retina. Only this much is primary. Any change in the light, in an attempt to eliminate some of it or bring it to a clearer focus, is a learned habit and must be classified as a secondary or associated reaction.

The physiological phase of seeing consists of changing the light that strikes the retina into nervous impulses and transmitting these impulses from the retina to the interpretive centers of the brain. This is the only phase of vision that remains constantly primary and with which no training can ever be done. Under this

phase also comes the physiological aspects of the eye motions. As with any neuro-muscular association, the factors involved can be varied at the will of the individual. Only general eye motions or the unassociated rovings of the eyes can be considered to be primary.

The primary reaction, generally considered to be a portion of the psychological phase of vision, is merely recognition by the individual that light is hitting upon the retina, or the awareness of a nervous impulse. This is often found in the lower organisms where they will move away, or be attracted to light, yet not definitely see objects. The recognition of objects by association must necessarily be a learned reaction.

In secondary visual skills, it must be clearly recognized that they are learned processes. They are usually formed by the combination in certain patterns of primary visual skills. From the original secondary habits so developed, further recombinations of skills are made and so on until the need of the individual has been met. As in any other form of living the person adopts the course of least resistance, and thus malformations of those skills may result.

In tracing the development of the secondary visual skills to their highest pinnacle, we will start with those developed from the primary skills. In order that an object out in space may be clearly seen, two conditions must be met. First, there must be adequate light. Second, there must be a clear focus upon the retina. Nature has provided an automatic diaphragm, the iris. This regulates by shutting down in the presence of too much light, or opening wider in the absence of sufficient light. This reaction occurs very young in the individual's life, being developed by the time the child gets his eyes open. The second phase, or a clear focus upon the retina, is regulated by the crystalline lens, which automatically increases or decreases the power of the eye so that objects either far or near remain in sharp focus upon the retina. To develop this "accommodation," nature makes most of the small babies excessively far-sighted, or hypermetropic, so that a constant stimulation is necessary.

As most of you know, there is only one small area of the eye that is capable of seeing really sharply. This is so small that at a distance of ten feet only two inches of space can be held totally and equally clear. From the primary eye movements (which, as you will remember, were aimless wanderings) the movements develop so as to be first monocularly then binocularly capable of turning the eyes, directing them to identical points on the object, that the two images shall lie on identical points on the two retinae. This

act is known as fixation, which is accompanied by accurate focusing involving accommodation for all distances within infinity. Thus, the best binocular vision of the object may be obtained.

Concurrently, other developments are going on; the brain is beginning to recognize, by association and repeated stimuli, certain objects and colors as having been seen before. Thus, intelligent recognition of the stimulus being sent to the brain develops from the original ability to perceive light. Recognition of a stimulus happens first. It is the condition of the stimulus presented to the brain that sets off the mechanism regulating the focus upon the retina, and the fixating of the image upon the fovea of the eye.

Therefore, the statement can be made that seeing is a psychological phenomenon. We see, not with the eyes, but from the image recreated in the brain and projected out into space.

These three factors, then, clear focus, fixation of the image upon the fovea, and the interpretation of what is being seen, form the basis for all further development of visual skills. Single, simultaneous, binocular vision is the combination by the brain of the images of the two eyes. In order that this be made possible there is an association developed between the accommodation and the convergence of the eyes. This is called the triangulation reflex. By constant association, whenever the eyes converge, the eyes also tend to accommodate. The reverse is also true. These reactions are known as accommodative convergence or the convergence-accommodation. They are important to us because it is by the use of these, that investigations of advanced visual skills become possible.

In any list of modern visual skills, reading printed words must be placed first. Today a large part of education is by means of such reading. Reading printed words involves two sets of visual skills: First, the mechanical motions by which the eyes move across the page, pausing to fixate the words, yet seeing them clearly and singularly; and second, the skill needed to comprehend the artificial symbols that the eyes are seeing.

Two other sets of visual skills must also be named if our picture is to be complete. Those visual skills are needed by the person to carry on adequately his or her occupation and avocation. These are, of course, as varied as are occupations. Each one requires a definite study of the use of the eyes in that occupation if a true recognition of the need is to be found.

There is very little similarity between the recreations of the people today and centuries ago, but in most cases a thorough study of the visual skills needed in occupations, will also touch upon most

of the skills needed for avocations. What is one person's work is another person's pleasure. Some people say it depends upon whether or not one is paid for what he is doing.

Visual skills and visual training are based upon certain definite rules or foundations. As previously stated, seeing is made possible by an elaborate series of learned reactions or habits. Any rule that can be applied to any habit, can also be applied to seeing. Therefore, any visual habit can be eliminated, and new ones substituted, or development controlled, so that advancement can be made along a certain definite design.

The difficulties involved in any such program of development are governed chiefly by three factors: How fundamental the habit is; the length of time it has been established; and the reason for its development in the first place. The time of development in an individual, and its degree of usefulness to the individual will generally control what can be done with it. All eye habits are developed in response to certain needs by the individual. Normally, the majority of uses need the same general visual skills. If this were not true, modern education as we know it could never have developed.

The usual order of the development of visual skills from infancy to maturity proceeds around known landmarks. Barring certain factors that we shall discuss later, it proceeds as follows:

1. Perception of light.
2. Moving of the eyes toward that light.
3. Differentiation of color or intensities of light.
4. Differentiations of objects.
5. Clear focus of objects.
6. Recognition of objects.
7. Accurate fixation upon objects, first monocularly, then binocularly.
8. Hand-eye co-ordination.
9. Specialized visual skills, such as reading, occupational, and recreational.
10. Judgments of distance and size of non-reachable objects. This is commonly called depth perception. It may be monocular or binocular. If the distance is judged by the kinesthetic clues gained in the convergence of the eyes, it is binocular. If it is gained by perspective, overlay, or highlights or shadows, it is monocular. Actually, there are four binocular clues to depth perception, and fourteen clues to monocular depth perception.

Most judgments, however, combine both sets.

If, for any reason, the development of these skills is faulty, they are easiest to correct in the reverse order to that in which they developed.

There are very, very many reasons why the proper development of visual skills sometimes fails. These also can be classified into three types—physical, physiological, and psychological.

Physical factors in themselves are perhaps the most common causes. They are: Lack of the proper organisms to develop; permanent or disabling injuries; diseases; and optical factors. Optical factors, of course, fall into the old standbys of hypermetropia, (far-sightedness), myopia (near-sightedness), and astigmatism (distorted vision). Also entering under optical errors is a relatively new one, called aniseikonia (that condition in which the images seen by the two eyes are unequal in size or shape. With this condition, the brain has difficulty or is unable to fuse the two images.)

Why proper habits or skills fail to develop if the parts of the eye are missing or injured, requires no additional explanation. However, it may be well to explain how optical errors can affect the formation of visual habits. Vision is composed of many habits, all functioning together to produce the whole interpretation of what is being seen. Assume, however, that in the primary stage of vision there existed an optical error. If this error were great enough so that it could not be corrected by the subconscious nervous system, then the brain would turn control over to the voluntary or conscious nervous system. As the voluntary nervous system is much less efficient than the autonomic, there is a much more rapid nervous fatigue. Also the attention of the individual is preoccupied upon clearing the image rather than upon the material he is trying to comprehend. If there be any flaw in the development of any of the original visual skills, then all the higher skills that normally incorporate that primary skill in their execution will suffer, and will seldom develop. If they do, they are faulty and inefficient.

It is for this reason that startling gains are made by some students after they have been fitted with a pair of corrective lenses. Before any visual training can be accomplished and made to stick, it is necessary that the eyes be freed from any error of refraction by means of glasses. The correction of the eye errors allows the student to concentrate upon the interpretation of the material or the accomplishment of the purpose, rather than upon the mechanical or functional phases of visual skills.

Physiologically many reasons can be listed for impeding or preventing the proper development of visual skills. One is nerve blocks

or mental tics, where the stimulus going to the muscles of the eyes merely go into a spasm. This is very similar to the effect produced upon the speech of a stutterer. Again there are weak muscles, that is, muscles that are too weak to perform adequately the function they normally should carry out. Another condition that very closely resembles that of weak muscles, is weak stimulus to those muscles by the nerve. This is usually caused by some injury to that nerve or to a lack of development. However, toxic conditions of the body will also produce a result very close to that of disease.

Of the physiological reasons why visual skills fail to develop normally, muscular imbalance of the two eyes is the most important. Whenever the eyes are moving from one object to another, there is a temporary suppression of the fovea regions of each eye. This allows the eyes to assume instantly their primary positions in the orbit. If any muscular imbalances exist, either due to an abnormal accommodative convergence tie-up, toxic conditions, or injury at some time, (usually at birth), the eyes tend to turn in or out, up or down, as the case may be. This then requires abnormal effort for fixation upon the object so it may be seen singly, requiring time, and concentration. The effect upon the visual skills is precisely like that described for errors of refraction. Effort is spent to perform the skill, rather than upon interpretation of the result of the skill's execution.

Although psychological factors may not as often interfere with the development of visual skills as the physical and physiological factors, yet they constitute perhaps the most varied list of causes of such interference. As a matter of fact, they follow almost exactly the list of psychological causes of reading disabilities. They are: low general intelligence; poor motivation; word blindness; personality disorders; unhealthy home life; reversal tendencies, ocular and manual dominance; and symbolia. Naturally, many more could be added to the list. Such studies occur regularly and each investigator usually finds many additional causes.

We have now covered what might be called a basic introductive outline to visual skills and visual training. You have been given the whys, whens, and wherefores of this subject. We are now ready to enter into the factors of visual skills and training that are of more importance to you as educators and teachers. These are the various methods of investigating visual skills, and the methods of training used to perfect and develop those visual skills.

To investigate visual skills, there are two methods available: Subjective methods; and objective methods. Whenever we use visual phenomena reported by the patient, the method is "subjective." If

we depend upon instruments and actual observations independent of what the patient reports, we designate the techniques "objective."

The first subjective method used in investigating visual skills is questioning the patient to find out what his symptoms or complaints are, how long he has had them, how severe the symptoms are, what first brought them on, what general effect the symptoms have had upon him, and his general physical condition. It has been said that most doctors, if given their choice of making all tests known to man, or asking intelligent questions of the patient about his condition, would take the latter. Easily half of the visual problems one will encounter can be diagnosed by intelligent appraisal of the history so obtained from the patient. In any event it is necessary to understand and evaluate all data obtained in other ways.

The second method of subjective examination is by a general eye refraction. It is not necessary to go into much detail about eye examination. In a group of this type all of you have had your eyes examined or watched someone else in the process. Its main purpose is to determine the actual physical error of the eyes, and what lenses are needed to enable the patient to see the best and with the greatest comfort. The techniques used to determine this are many, but the results are the same. Glasses, as such, are prescribed to allow the patient to devote as little conscious effort and as little nervous energy as possible to the routine act of seeing. In any investigation of visual skills a thorough and complete general refraction must precede all other tests. It is termed subjective because we are entirely dependent upon the changes in vision reported by the patient when we introduce changes into the physical factor of seeing (changes in the light before it enters the eye).

To determine subjectively the relative strength of the muscles of the eyes, a number of tests are taken. First, the eyes are made to follow an object through the entire range of vision. With the head fixed, the object is moved to the right, left, up, down, and in a circular motion, also brought toward the nose. The limits of binocular and monocular eye motions so tested are then called versions. A report by the patient of seeing the object double at any time can be accepted to indicate that the limit of the versions in that direction has been reached. This establishes to the examiner that there are or are not faulty muscles, or nerve blocks that prevent the establishment of visual skills or prevent the successful training of visual skills. Much additional information can be gained from this simple test, but it will be brought out under the objective phase of testing visual skills.

After the ability to rotate the eye adequately is established, three additional muscle tests are taken using Risley prisms. Their construction is such that the prism power can be either increased or decreased smoothly and at the will of the operator. The eyes are fixed upon a point first at distance then at near, and the power of the prism increased. The eyes follow the displacement of the image, until they can no longer follow the object and therefore see double. The power is then reduced until the eyes recover single vision. The results are called ductions. Usually the test is repeated three times, making the eyes turn first in, then out, and last up and down. It is scored as the break over the recovery. It is important to us, because any excessive lowering or raising of these ductions either individually or collectively is indicative of an interference in vision, and will find its counterpart in the loss or impairment of related visual skills.

One of the most important of the visual skills is the binocular use of the two eyes. Therefore, it is necessary that we constantly be assured that both eyes are being used equally. Occasionally, we find the eyes, instead of being used together, are used alternately. Yet, those eyes to all appearance may seem to be focused straight ahead. This is accomplished by mental suppressing of the image in one eye.

Suppression is divided up into various grades. Total suppression of one eye with the other doing continually and constantly all the fine detail of seeing. Alternating suppression obtains when one eye sees for a time, then the other eye. However, the most common phase is partial suppression found in cases of impairment in binocular visual skills, or when the strain in performing the binocular skills becomes too great.

The investigation of suppression is usually by two methods. First and simplest is a plain red glass filter. The eye is directed toward a small white spot of light at any desired distance. The red glass is placed over one eye. Then, if both eyes are functioning equally, the light will be seen to be a pinkish white. Just white or just red is a sign that suppression is taking place.

A more exact method is available by using a stereoscope. In this test, two halves of a picture are presented so the combined image is a completed picture. The patient reports what is being seen and any omission is evidence of suppression. A simple test is the ring and star test. In this test, a small star is presented to one eye, and a larger ring is presented to the other. The object, of course, is to place the ring around the star. When this is done,

any suppression shows up by the star being missing or parts of the ring not being seen. Sometimes, the entire ring will be gone. Various grades are determined by asking if the missing portions are gone all of the time or seem to fluctuate.

Depth perception is important to the investigator, because it is the highest development of the original visual skills needed by man, barring, of course, specialized occupational and recreational needs. The only method by which it can be investigated is subjectively. This is done by having the patient tell the examiner which of two objects appears closer. This can be done by actual measurement or by stereometric cards used in a stereoscope. The Howard-Dolman test is an example of the first. Two rods, one fixed, the other controllable by the subject, are presented to his vision. The purpose of the test is to have the patient line up the rods one alongside of the other. The actual error in judgment is measured by the distance in millimeters between the two rods.

When measured in a sterescope, cards are used which present characters requiring varying degrees of convergence. Thus, through kinesthetic clues, the mind projects one object to a greater distance than the other. The more the eyes converge, the closer the object appears. This is the basis of all stereoscopic pictures viewed with a stereoscope and duplicates the sensations of viewing objects in space.

Fusion, like suppression and depth perception, is another visual skill that must be investigated subjectively. Measurements of this visual skill are made similarly to those of suppression, with the red filter glass or by the stereoscope. The technic is about the same except that additional observations are made. First, of course, is the pinkish color of the light. Second, we can inquire if the patient sees two lights, one completely red, the other completely white. An answer of this kind indicates complete lack of fusion. However, it is possible that the patient may see the light pink for a short time, then it may separate as the fusion faculty becomes fatigued. Thus, various grades of fusion become apparent.

When measured upon the stereoscope, the patient fuses two similar pictures. One has on it a small horizontal line, the other a small vertical line. They are so placed that if fusion is perfect, they will form a perfect cross. Any displacement is judged by the position of the horizontal line in regard to the vertical, and is evident of the grade of fusion. For example, if to the patient, the picture appears fused, yet the cross is lopsided, then it is indicative of a low grade fusion. Fusion is usually measured both for distance and near.

Objective methods of determining visual skills are usually taken after the subjective methods have been completed. This procedure is followed because the patient gets a little training as he goes along. His response to directions becomes increasingly accurate. Objective methods, you will remember, are those methods by which we get our information from actual observation and measurements without depending upon the judgment of the patient. These are more important in small children than in adults, who have been trained to give their own opinions. Children will often tell you what they think you want to hear. Consequently, an effort is constantly made with children to keep our investigations completely objective.

It is possible to determine the exact error of the eye by observing the shadow cast by a light moving across the eye. This error, so determined, will usually be practically the same as that found subjectively with trial lenses. In young children this determination of the eye error is used in prescribing glasses to a greater extent than the subjective refraction.

In muscle tests it is possible to observe the motion of the eyes. Through this technic a paralysis or deviation of any muscle can be noticed. Also important in observation is jerkiness in any part of the field of rotation. In determining muscle strength we can watch the eyes and see when they cease turning in or out or up and down, and also observe when they recover the image. This is not easy to do and is not as exact as the patient reporting double vision. However, in young children, it is the only accurate method.

Fusion and depth perception are impossible to measure objectively, as they are truly psychological phenomena. They are essentially psychic blending of the two images formed by the impulses transmitted to the brain.

The above has been merely an outline of the various methods generally used in determining the fundamental visual skills. As you can realize, these visual skills are the building blocks from which all other visual skills are fashioned. Each of the advanced visual skills, such as reading and many others depend upon combinations of these for their execution. Consequently, for each visual skill, there is an elaborate series of tests that can be made in addition to the few that have been outlined. They are, however, just a recombination of these, made more complicated or exact in order that special information may be derived from the test. Mention of these, particularly in regard to reading, will be made later. The general tests already discussed are certainly landmarks. From

these, we can determine what to do next or possibly what the trouble is.

The instruments used in investigating visual skills are few, when one considers the number of visual skills. Most essential is the stereoscope. The Brewster stereoscope and the Wheatstone stereoscope are two types. Most people are familiar with the Brewster type. It has two prismatic lenses separated by a diaphragm. The stereoscopic cards are observed directly by the patient. The Wheatstone type may be a little strange to you. The targets are placed at right angles to the patient, and he sees them reflected in two mirrors placed at an angle of forty-five degrees to the eyes.

Either instrument can be used for anything that the other is used for. However, due to the mechanical construction and ease of operation, it is usually found that diagnostic work can be performed better upon the Brewster, or regular type, stereoscope; and that visual training is more satisfactorily executed upon the Wheatstone stereoscope.

Used with the stereoscopes, of course must be suitable cards or targets. These are readily obtainable in endless variety and for any purpose. In fact, if one has a particular problem, or something he wishes to investigate, the producers of the stereoscopic cards will either supply suitable stereograms or have them made to fulfill his needs. The art of making stereograms is an old-time skill. Regardless of the visual skill you wish to test, you will find already prepared many different cards or series of cards that will test the same function. It has been stated that the stereoscope is to the eye doctor what the stethescope is to the medical doctor.

With the stereoscope, a few trial lenses, and two variable prisms, one can therefore do almost all basic testing of visual skills. In fact, probably 99 per cent of all investigations of visual skills are carried out with just such apparatus. For the complete job, however, one must have one more piece of equipment. This is the eye camera, called the ophthalmograph. This instrument actually takes a picture of the eyes while in action. It faithfully records all starts, stops, jerks, twists, and all other possible eye motions, and the visual skills with which those eyes are operating. It is our greatest aid in the correcting of reading difficulties.

The eye motion camera is a development from physiological optics. At the beginning, eye motions were observed directly through a telescope or a peep-hole in the material being read. Later, mechanical recording devices attached to the eye or eyelid, recorded upon smoked paper a graph of the eye motions. Microphones have

been attached to the upper eye lid so that the motion of the eyes could be counted by listening to the sounds. The difficulties of these methods can be readily understood. It was not until the advent of photographic film that a simple way of recording the actual eye motions for diagnosis and study presented itself to the investigators of visual skills. As would be expected, the difficulties in developing such apparatus were tremendous. Many technics were tried and discarded. True progress was not made until motion picture film became generally available and completely understood.

All eye motion photography is now taken on a moving film. A bright light is focused first upon the cornea of each eye. The reflection for the corneas is then brought to focus upon the film. As the eyes and the film move, each change of eye position is recorded, and a continuous picture is made available for accurate measurement and exact diagnosis.

The last form by which we test visual skills is completely psychological. They are the various forms of psychological tests devised to give us information as the interpretive phase of vision. As these are completely familiar to you, we shall only give related examples. Common types are the reading tests designed to measure ability, speed, and comprehension. With these we can get an almost perfect picture of what is lacking in the person's reading ability, and often the answer as to just what should be done to correct it. Under this classification are the various types of tests used to determine color vision. Various methods are available. Sometimes the patient is asked to determine the color of yarn. At other times he is instructed to pick out a number composed of one-color dots, while the background is made of the complementary colors. The latest methods used to test color vision are dependent upon the after images of color. The patient's gaze is directed to a blank square surrounded by various colors after he has gazed at one color for a short time. He is then asked to determine which color his after image most resembles. This is the closest approach to a truly satisfactory test, as it completely eliminates the factor of memory or association with past experiences. It more exactly measures the true condition at the time of the test.

When we know why and in what way a patient is deficient in visual skills, our next job is to correct those deficiencies. This is accomplished by visual training. Visual training comes under two classifications, personal or uncontrolled, and supervised or controlled. The uncontrolled methods are used when the reason is minor. Improper posture or lack of practice are such reasons. When

using this method the patient is merely advised what to do and then left to himself to do it. He corrects his deficiencies by repeated efforts, until he overcomes his difficulties or develops a substitute that will serve his purposes.

In most cases, the use of personal training is impossible. Due to necessity for correcting first basic errors that have been built up by the patient over a long period of time. This requires elaborate instrumentation, long patient hours of encouragement, and a supervised scale of accomplishments. By this, the patient is led to the constant total exertion of his ability. As his ability grows in response to the training, then the difficulty of the work is increased.

To discuss controlled training, one first must realize that whenever visual skills either fail to develop or develop faultily, the effect upon the basic units that have been discussed is the same. In fact, it is the failure of these basic skills to function properly that cause the higher visual skills to be faulty. It matters little what causes the failure to read properly, the sequelae as recorded by an eye motion camera are the same. Therefore, it is necessary to always back-track and begin by correcting the most basic visual skill that is not functioning properly. Then it is possible to rebuild until the patient is brought to the point necessary for comfort and efficiency.

One of the simplest types of training and one which absolutely prohibits the child from doing any type of close work is the loss of the ability to accommodate, that is adjust the focus for various distances. To train this, we first correct any errors of refraction that may be present. Each eye is then trained to see an object clearly through concave lenses. These are gradually increased in power. When this can be done easily by each eye, the power of the total minus is reduced and the eyes made to look at the object binocularly. As the patient gains in ability, the power of the concave lenses is again increased. When normal ability for the age of the patient is reached, the artificial practice is stopped, and the patient's attention is directed to a near-point object. He practices bringing this closer and closer until the function is completely normal. This can usually be accomplished in two or three weeks. Although, if the error is caused from a serious illness, then the recovery time is somewhat longer.

To correct muscular imbalances or cases of actual deviations of the eyes, we first must go back and correct the tendency to suppress the image of the deviating eye. This is done by first monocularly flashing a bright light into the suppressing eye. Later, this is replaced with a steady light. Then large targets of gross detail are

substituted. As the vision becomes more acute, the detail of the targets is made finer and finer. When the visual acuity is high enough, then the patient is taught to be aware of double vision. That is, to appreciate that there is an impulse from each eye, even though it is not fused. The two objects are then brought into fusion by means of prisms, and the eyes are made to move while still holding this fusion. Little by little as the patient is able, the deviation of the eyes is reduced by lessening the amount of prism the eyes are looking through. This is continued until the patient is able to hold single, simultaneous, binocular vision with no artificial help from the instrument. The treatment then becomes the same as for overcoming muscle imbalances. The patient is given an amplitude of the impaired muscles large enough to overcome any tendencies for the eyes to deviate.

When this is accomplished, half of the battle is over. The next part is in attempting to get the patient to transfer the skills he has learned upon the machine to normal real-life seeing. This is done gradually and with constant attention to the possibility of regressions. Instruments that more and more closely approximate methods of seeing are used until at last the patient is able to look the word in the face with a straight eye, and no artificial help.

Depth perception is relatively easy to train as it is one of the most recently developed of the visual skills. Providing the primary habits of clear focus, fusion, and no suppression are functioning normally, it responds rapidly to training. Usually, we begin with the most obvious stereogram card in which the patient can recognize a marked difference in depth. If he is so poor that he can tell no differences, they are pointed out to him. Gradually the apparent differences between the distances of the objects is reduced as his kinesthetic senses become more acute. When he reaches normal upon the instrument he is then tried out by actual judgment with the Howard-Dolman test. If he passes, he can be dismissed as cured. If not, then further training upon the instrument is necessary until he is able to pass the test. It is usually wise to check upon the patient by having him actually judge differences between objects at different distances (such as two automobiles, etc.).

Color vision is at this time a subject of great controversy throughout the eye world. Many claim that they can cure color blindness by visual training. Others claim that they are merely training the patient to pass the various tests for color blindness, but not actually improving the basic color sensitivity. For your information, the technic is that of training the eyes through filters of the same color

in which the person is deficient. This is accompanied by large doses of Vitamin A to assist in the rebuilding of the retinal tissues and substances. Much interest has been stirred in this phase of visual skills due to the entrance requirements of certain branches of the service. However, as yet there has been no statistical survey of claims published. So, officially, the technic must be classified as doubtful.

For our example of the more complex types of visual training, we shall present one with which you are all familiar; namely, reading difficulties. Perhaps the hardest thing to correct in any case of reading difficulty is the attitude of the parents.

In any consideration of reading difficulties, first a diagnosis must be made. This is accomplished by the use of the various psychological tests already discussed, and with which you are familiar. When these have been taken and analyzed, the history of the case is taken to determine how long the condition has been present and when it first made its appearance. This usually will give a clue to the basic reason that caused the difficulty.

Next, a record of the eye motions is made with the eye camera. These give an actual picture of the trouble and the attempts that are being made to overcome it.

The actual correction of reading difficulties is exactly the same, regardless of the original cause. Whatever that cause was, the effect upon the visual skills are the same; poor reading.

We first eliminate all eye errors and muscle imbalances by glasses, or by preliminary visual training where that is possible. Also any of the primary visual skills that may be deficient, are brought up to normal. When this is completed, we are ready to go ahead with the process of building up the complex visual skill of reading.

Our first step is the training of the patient in the proper eye habits. This is done on the metronoscope, essentially a pacing device. This instrument is so designed that materials can be presented to the individual a word or line at a time. At the beginning the extreme left window opens for a short time, and as it closes the next window opens, and so on across the page. As the patient becomes more proficient, the speed of presentation is increased and more words are presented at each window. This training is continued until the eyes are trained to move evenly, quickly, and with accurate fixation, no tendency toward regressions, and with adequate span of recognition. The arrival at this point is determined by means of the eye camera.

The purpose of these steps is to have the eyes in such condition that the act of just seeing will be as habitual and as mechanical as possible. In other words, the patient will need to devote no conscious attention to the mere act of seeing. When this is completed, we are ready to go on to the training of the interpretation of the visual sensations.

Depending upon how retarded the patient is, we go back to material he can easily understand and master. Assuming we must start at zero, we would begin with a roll that contained pictures flanked to either side with the word normally associated with that picture. This is continued until a sufficient vocabulary has been built to enable the patient to understand the simplest stories.

These are, of course, in very large print and with only one word to the window of the metronoscope. The patient reads aloud with the machine going slowly enough so that he can easily keep up with the story. As the patient increases in ability, the speed of the machine is increased. When sufficient progress has been made, the difficulty of the stories is increased and the number of words per window is increased, and the size of the print is reduced. Each time the difficulty of the material is increased the machine must be slowed down so as to give the patient adequate time to conquer the material.

During this phase of training, the patient is constantly tested for comprehension, as well as his eye motions checked on the ophthalmograph. A list of the words missed or stumbled over is kept to be given to the patient as home work until the next visit. At that time he is retested upon the missed words. Eventually, the patient will reach the limits of oral reading and then it is time to go on to silent reading. To do this, the above procedure is followed but with careful attention to the elimination of silent lip motions. Now, the emphasis is placed upon smooth and proper eye motions with high comprehension rather than upon speed. Invariably, the patient's speed will come up if he thoroughly masters the basic fundamentals.

When the training has brought the patient up to the level of ability normal for his age or intelligence, he is switched from the instruments to books slightly below the level he has been accustomed to upon the machine. It is usually found that he can handle these with a minimum effort and a maximum of comprehension. The difficulty of the books is increased until he has reached a point slightly above his particular normalcy. This is done to take care of the slight slip-back occasioned when the training is stopped.

Usually, however, we have the patient return for progress reports at regular intervals. At these times he is given again the various psychological tests that measure reading ability and comprehension, as well as being retested with the eye motion camera. If he continues to progress normally over a period of one year, then we consider him cured.

In working with visual skills, we have at our command a very elaborate series of instruments. Usually, each one is designed to do one specific purpose. It is necessary to be continually switching the patient from one instrument to the other if satisfactory results are to be achieved. The requirements of a general all-around instrument for visual training would be (we have already covered diagnostic instruments): 1. Variable accommodation. 2. Variable convergence. 3. Electrical attachments that allow the lights to be flashed monocularly, binocularly, and alternately. 4. Motion both in a circular and meridional patterns with the angular swing of each variable in amount. 5. Interchangeability of targets. 6. Similarity to the use of the eyes in normal seeing.

In conclusion, I would like to outline to you the various results that we are able to accomplish by means of visual training. Remembering that work in this field is comparatively limited to recent times, and that much is left to be done, I still feel that some of our accomplishments are just short of miraculous.

By training the accommodation or refractive stages of vision, we are able to reduce or control near-sightedness in a majority of cases. We can improve the vision over existing errors by the proper training of interpretation of what is being seen. To prove this, we have the records of thousands of men who, by these methods, have been visually reconditioned and enabled successfully to pass the eye tests of the armed forces. A pamphlet that describes this in detail is called Grounded Eagles Fly Again, obtainable from the magazine, *Vision*.

By training squint, the muscular imbalances in many cases, the eyes can be straightened or be made to balance without resorting to surgery. If the surgery needs to be done, then our technics facilitate subsequent training of the person to use his eyes as they were meant to be used. It also prevents the recurrence of the deviation of the eyes, or the tendency of the eyes to deviate in the opposite direction, a possible sequel to surgery.

By training color vision, we can show definite improvement as reported by the patient in his world of greys. Many people, for the first time, are able to appreciate a sunset as the array of brilliant

colors it is, rather than just dark clouds. We can train them to pass all standard tests of color vision. This also is covered in the pamphlet, Grounded Eagles Fly Again.

By training depth perception, a person can be made to judge distances more accurately, and trained to pass tests of depth perception. He is better equipped to handle himself in this world of fast moving cars and airplanes.

By various specialized training to visually equip a man to handle his particular job, we can make a better and safer workman of him, and increase the joy of living by eliminating visual fatigue and leaving him able to relax after he finishes work.

By training, we can eliminate, in most cases, and greatly help in others, reading disabilities. Our results in this field seem to depend upon the general intelligence of the person. In most cases, satisfactory results can be shown in a few lessons, with the patient recovering his normal grade level in two to four months. It has been found that if we can give to the patient basic habits permanently and correctly formed, the patient will then continue by normal self-practice.

How far this field will continue to progress, we do not know. In practice it is usually impossible for the average practitioner to work with much training of visual skills. Lack of equipment and definite routines, plus the fact that much of the developments in this field are not known outside of the laboratories and clinics set up for the purpose, tend to limit the eye doctor to those errors that can be corrected by glasses.

Many men have the equipment for simple muscle training, but in general it lies unused due to the length of time needed for correction and to the spotty results obtained by the inexperienced operators. In addition to this, we have the reluctance of people to accept anything new.

However, as new men enter the field of eyesight conservation and visual efficiency, they will be educated to prevention and its importance, rather than correction after the damage has been done. At that time, we will be able to give to the schools, who in turn will be able to give to the students, methods of visual education that will insure the proper developments of those visual skills needed to face civilization as we know it today.

LIP READING

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Lip Reading is by no means a new accomplishment. As early as the 16th century in several European countries both hard-of-hearing adults and deaf children were observed to be able to understand a speaker by watching the movement of the lips and other organs of speech. In 1648 John Bulwer defined lip reading as, "The study of that subtile art which may enable one with an observant eie to heare what any man speaks by the moving of lips". Since then various definitions have been given. All, however, will agree that lip reading is a process of readjustment. Instead of receiving sound waves that are transmitted to the auditory center of the brain by way of the ear, the lip reader learns to transpose into thought the *visible* movements of the organs of speech. Just as various definitions have developed through the years, so also different methods for lip reading have been devised.

Method means a "way". No method is invented spontaneously. Methods are slowly developed. Every teacher should have one basic method as a foundation, but each one finds it necessary to adapt his means to the needs of his class, or to the individual under his instruction. Each year has brought a deeper, richer understanding of the problems confronting the hard-of-hearing, while the principles of the Mueller-Walle Method have remained the same, many additions and some other changes have been made.

One question that has been widely discussed is the value of a so-called synthetic or psychological method over an analytical one. I am convinced that the use of both is necessary in order to become a good lip reader. To have a school stand for only one of these, or even to put more emphasis on one, is wrong. Every teacher has found that pupils show a marked difference in their abilities to master the art of lip reading. It remains for the teacher to decide what kinds of exercises are best for the pupil in question. It is true that, for successful lip reading, the synthetic type of attention should predominate. However, there must be something of the analytic, fixating type that grasps details just as in reading a foreign language one must be familiar with the script. A physician, a naturalist, or an astronomer all see much that escapes the notice of the ordinary

man, even though the ordinary man may look carefully. This is not because the sight of the scientist is naturally keener, but it is because he has been trained to note points necessary for his vocation. And so, if sight is to take the place of sound, sight processes must be trained to note the *visible* characteristic movements of the organs of speech.

In the Mueller-Walle Method this is accomplished through rapid, rhythmic syllable drills. This, to my mind, is the most logical and sequential way of training for accurate seeing, for seeing quickly and subconsciously. Naturally such drills are not meant for the children in the primary grades. Such children are taught entirely by the informal lessons. For the adult and for the older school children there is no better way of laying a solid foundation, provided the exercises are given in the right way; and herein lies the secret of success. Teachers who have mastered the exercises and give them in the correct way all agree that their value cannot be over-estimated. Our syllable drills are used in speech correction classes in schools for the deaf, as well as for lip reading instruction.

The teacher must be prepared to give the syllables in everchanging combinations with the rapidity and fluency of natural speech and with rhythm. They must not be read from a book. The drills given in the text books are merely models. One syllable is never given alone and all drills should lead up to a sentence. A study of these exercises will reveal that they are by no means simply meaningless combinations, but units of speech that occur in every spoken sentence. For example: ma we, tha ma, we co, hou fa, hoo saw, cease to be "syllable drills" to the lip reader when he watches a spoken sentence. "May we go with you?" "How far did you walk?" Having these combinations as a foundation his mind is able to combine intelligently into a complete thought what he sees at a glance. This process of combining quickly is very important to the lip reader. From a psychological point of view, this mental activity is clear and simple. The better the sight process is trained, the better the brain responds, until the two work almost simultaneously and *to see is to combine* or, even more the expert lip reader can combine without necessarily seeing every individual movement. The many obscure movements are never practised in syllable drills.

Syllable drills should not be practised too long at one time. They require absolute concentration and tire the seer more than do sentences. After they have been practised from three to five minutes at a time, sentences containing words based on the respective sounds

are given, or in other words, these drills are given, or in other words, these drills are put to practical use.

Some exercises are especially planned to show certain important characteristics of the movements, for example, accent or rhythm. Take the pronouns I, she, he, it, we, they. Given thus alone, each has a definite movement of its own. Following this by a drill or *I shall, he shall, she will, they may,* etc., we see at once that, the accent falling on the auxiliary, the pronoun is less important.

Next we add a verb to the auxiliary, *I shall see, they may go.* Here the accent falls on the verb, giving the auxiliary a different appearance. Then we add a noun or a phrase, thus: *I shall see the farm. I may go with them.* Lastly, we begin the sentence with an adverb, *Where shall I buy shoes?* The ever changing rhythm in these sentences gives a different movement to the single word—first a long, then a short, a principal or a secondary movement.

Rhythmic speech is manifested by rhythmic movements of the lips and is intelligible to the sight of the lip reader. The person who acquired deafness after having learned to speak perfectly, reads no single movements of sounds but the whole rhythm of each expression subconsciously. This is also found to be the case among children in schools for the deaf. For example a finding reported in Studies in the Psychology of the Deaf, No. 1, The Psychological Division Clarke School for the Deaf, Northampton, Mass., states, "Children who can follow a rhythm better are also better lip readers. Since there is practically no relation between rhythm performance, and intelligence, the relation between lip reading and rhythm performance can not be due to intelligence."

Lip Reading requires concentration. A lesson made up entirely of drill work would not only become burdensome and uninteresting, but would be of little value. The question naturally follows: How long should practice continue at one time?

It is a well established fact that if one is going to devote a given amount of time to a learning task, short, but frequent work periods will be more beneficial than long ones. This can be accomplished in the lip reading classes by dividing the lesson hour into periods of different types of exercises. All are necessary and should go hand in hand. For, after all, a person does not study lip reading merely for the purpose of acquiring a theoretical knowledge of the subject, or merely for the purpose of reading the teacher's lips in the classroom. The lip reader is in much the same position as the student of a foreign language. It is an undeniable fact that a person can read a foreign language without being able to speak it readily. Just so,

there are hard-of-hearing persons who have no difficulty in reading the speaker's lips.

The deafened pupil has, on account of increasing loss of hearing, been more or less shut out from a general conversation. Little by little, he loses the ability of taking part. Hence, this ability needs to be re-acquired along with the development of the ability for the reading of the lips.

Lip Reading is an art, not a science. Art requires skill or ability rather than knowledge. If we consider our problem from the point of view of abilities achieved, rather than from the point of view of information acquired, then we must place emphasis on developing the power through carrying on, both in and out of class activities involving the use of lip reading.

What are these activities? If our chief aim is to follow conversation we must not only give our pupils many opportunities to read from different lips, but also teach them to take an active part as well. Just when the group practice is introduced must be left to the discretion of the teacher. The sooner it is done the better. As the basis for this work, we use phrases which are second speech units. For ordinary conversation the pattern of all the sentences that we have been using throughout our lives are stored up in our brains. If we meet someone, without any material effort we say, "How do you do?" We say it subconsciously. If the lip reader has at his command a stock of ready-made units that operate semi-automatically in arriving at meaning, a natural foundation already exists for conveying meaning. In listening to a lecture or a sermon, the lip reader often loses the thread. The moment a familiar phrase or quotation is given it stands out and often enables the reader to pick up the thread.

The exercises must be carefully prepared by the teacher beforehand. They must be novel and varied. They must not be confined to mere questions and answers, but should include opportunity to finish an incomplete remark, to change words and phrases in a given sentence rapidly, or to expand into a brief statement. For the beginners, it is a good plan for the teacher to read the group of phrases intended for the lesson through first, pupils reading them from her lips, thus concentrating their thoughts on the subject in question.

For example:

Sunday before last . . . .
A week from tomorrow . . . .
After the first of May . . . .
Every other Saturday . . . .

Then the pupils in turn put the phrase given by the teacher into a sentence. The sentences must *begin* with the phrase. When all phrases have been used in this way, repeat by having pupils use the given phrase at the *end* of a sentence. Then make a longer one using the phrase in the *middle* of a sentence. In giving these exercises the work must not drag. Pupils must be given to understand that here we cannot allow too much repetition. He should get the thought.

After groups of phrases have been practised in this way, then exercises using words of diverse meaning, or opposites may be used, or suffixes and prefixes may be added. The variations in these exercises keep them from becoming monotonous.

Later, exercises on different subjects may be used. The material must be worth while. Given good material, interest is sustained. Pupils will unconsciously converse and lose themselves in their eagerness to follow the general trend.

Group work does another thing. It teaches deaf persons to work with one another. The real function of lip reading is to enable the pupil to take his place again in the world; and he is far more likely to do so after this intermediate mingling with other deafened persons and trying his wings under guidance of the teacher. In these exercises the work must be prepared so that each in turn may take part.

The question is often asked, "Should a person who still has a fair amount of hearing study lip reading?" The answer is, "Yes, teach the eyes to assist your ears." How is this accomplished? By making the work in the classroom and the practice of reading one another's lips, as nearly as possible typical of the speech a person encounters outside. It is therefore obvious that speaking without voice should never be permitted.

In the first place, it is not natural and there is always a tendency to exaggerate. But still more important is the fact that, when a pupil with a fair amount of hearing is taught to read the lips, when no voice is used, he will demand the same conditions outside. The moment he hears the least bit of voice, he will strain every nerve to hear, rather than to watch the lips. The habit is too strong.

The reason why pupils often claim they hear what is said in the lip reading class is that, with them, the acoustic speech type predominates in a marked degree. Lip reading functions with them by means of acoustic representations. They imagine they hear the speaker as soon as they understand him. Teachers have tried speaking without voice and even then such pupils insist that they hear. These cases are evidence that lip reading is capable of functioning by means of acoustic representations. To those who retain a clear memory of sound and who read the lips, the work of the eye is entirely subconscious, the conscious reaction being that of the mental ear. We understand the spoken word not by the conscious reaction of the physical eye to the stimuli of movements, but through the reaction of the mental ear to subconscious visual images.

It is generally accepted that, technically speaking, the goal of instruction and study of a foreign language is to read and speak it. That is, to read it as one reads one's native language, without translating. The goal of the lip reader is not merely to "listen with the eyes," but to take an active part in the conversation. More stress should be put upon this.

The work may be divided into three parts, namely:

1. The Technique of Reading Syllables.
2. The Technique of Reading Phrases.
3. The Technique of Questions and Answers.

The purpose of the question and answer is *Not* to elicit "the answer." It is to enable the student to acquire skill in catching the oral question, the ability to hold it in mind, and to turn it into answer form by association of ideas. The pupil trains his power of concentration and attention. He acquires confidence in taking an active part. All this may not appear at first sight to contain much that is new. We have all used group work with our pupils from the very beginning. But this phase of the teaching should be used more frequently.

Lip Reading, that "subtle art", is not learned over night; and all who have attained success will agree with the eminent lawyer (one of our pupils) who deduced the following necessary qualifications for success:

"That Student
will make the most rapid progress
in Lip Reading who has
The eye of a huntsman,

The insight of an artist,
The rhythm of a musician,
The concentration of thought of a scientist,
The ruthlessness of purpose of a financier,
The vision of a mind reader,
And the ability of a little boy who
'Guessed right the very first time'."

DEVELOPING A HEARING CONSERVATION PROGRAM ON A COUNTY-WIDE BASIS

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Planning, organizing and developing a Hearing Conservation Program on a county-wide basis was something new in the annals of public health and educational history when such a program was undertaken by the Ventura County Schools Department in the fall of 1943. The determination to organize and maintain such a program came as the result of a study conducted at the request of the Superintendent of the County Schools and the Co-ordinator of Health. School, and public health nurses from the Ventura County Health Department who serviced schools, were asked by the health co-ordinator to study the health cards of their respective schools in order to determine the number of handicapped children in the county. When the results were tabulated, it was evident that three factors, viz.; lack of good dental hygiene, impaired hearing and defective vision, were largely responsible for engendering handicapping defects to the children of our county. A check on attempts being made to solve the problem of how best to combat the crippling effects of the above mentioned factors showed, first, that 85 per cent of the school children were receiving some sort of dental examination, second, that approximately 80 per cent of them had been given vision tests by means of the Snellen Chart, and third, that only 35 per cent of them had been given hearing tests. Therefore, it was decided that the County Schools Office

would instigate a hearing conservation program, provided the County Health Department would cooperate in the venture. A thorough study was made by the health co-ordinator of the problems which would be encountered if a program to find the child with the hearing loss were undertaken. The facts gleaned from this study were then placed before the acting county health officer and a program which provided for the joint administration of the undertaking was agreed upon.

Impetus was given to the program at this stage by one of the Rotary Clubs of the county. The philanthropic work of Rotary International is concerned with persons handicapped by a hearing loss, and this particular club, in seeking to advance its national project secured as a speaker for one of its meetings, Mrs. Spencer Tracy, from the John Tracy Clinic of Los Angeles. As a result of her most illuminating talk, the Rotary Club became interested in the establishment of a school for deaf children of pre-school age. Fired with enthusiasm and determined to aid children thus handicapped the club sent a delegation to call on the county superintendent of schools to obtain information regarding the number of children from birth to three years of age who were known to have a sufficiently great loss of hearing that they could be regarded as potential pupils for a school similar to the one conducted at the Tracy Clinic. The committee was referred to the co-ordinator of health for assistance and she, having no statistics to give them regarding deaf children of that age, countered with the statistics which had been obtained regarding the number of school children in the county who had been found to have a hearing loss. This information had been gained by more or less spotty testing in the various schools by the nurses using the 4B Western Electric Speech Phonograph Audiometer. Realizing the magnitude of the proposed undertaking, the club decided to forego the establishment of the pre-school project and to lend its support to the proposed hearing conservation program of the county schools.

Finally, after almost a year of thought and study, a hearing conservation program on a county-wide basis began to take shape. The proposed outline provided for the joint administration of the program by the two county agencies, the school's office and the health department. Meeting as a joint committee, the county superintendent of schools and those members of his staff who would be involved in conducting such a project met with the acting county health officer and her staff and drew up the final plans for program administration. It was agreed that the program would be divided

into five phases, namely, case finding, remedial, educational, guidance, and public relations. Some of the problems discussed were the functions of each agency with regard for the administration and financing of the program, the handling of public relations, the methods to be employed in case-finding, who would make the medical diagnosis and do the follow-up, and also who would make recommendations regarding the educational follow-up. The Consultant for the Hard of Hearing from the State Department of Public Health was called upon by the County Health Officer to assist in the actual launching of the program.

The consultant was invited to attend a public relations meeting which was held in Ventura. Also invited to attend this meeting were the otologists from all parts of the county, representatives from the County Medical Society, the Medical Social Director from the county hospital, the staffs of the county health department and of the Ventura County Schools Office, administrators from all the schools in the county, the County Board of Education, representatives from the four Rotary Clubs in the county, school nurses, members of local women's groups, i.e., the Woman's Club, various local sororities, the president of the Twelfth District Congress of Parents and Teachers and representatives from such other groups as it was thought would be interested in the success of the program. At the meeting an outline was given of the proposed program, plans for its installation discussed and a promise secured from those present that they would back the project.

Following the meeting, approximately four more months were required to complete the plans for the formation of the hearing conservation program and to secure the services of an audiometrician who would be able to assume the case-finding duties. It had been decided that the audiometrician would be paid by the county schools department from county unapportioned funds. The audiometrician, in addition to carrying on the case-finding program, was also to work with the health department in organizing the remedial phases of the program, act as a public relations contact to bring the facts concerning the program to the various organizations of the county, and to work with the administrators in seeking to provide educational follow-up for those who had need of it. As the program of public relations expanded, the movie "How We Hear," was used together with a demonstration of group hearing tests for many service clubs, woman's clubs and Parent Teacher organizations throughout the county. The movie and the demonstration were preceded by a talk by the audiometrician concerning

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the organization and the functioning of the program. Later, when the co-ordinator of education for the hard-of-hearing was added to the program she, too, attended the meetings and talked to the group regarding the educational part of the program. As a result of this type of program, a better understanding of what the county was trying to accomplish was obtained by the various persons who heard it, interest was aroused in the undertaking and parents began to request hearing tests for their children. In addition, many adults who found they had a loss of hearing when they took the number test came to the office of the audiometrician for pure tone tests. The press became interested in the proceedings and a representative was sent with the audiometrician when she went into one of the larger schools to do a testing program. All phases of the case-finding set-up were viewed by the reporter and the results of the day's observations were reported in great detail in the local paper. This publicity served to increase the interest of the public in the effort being made to find the hard-of-hearing children in the schools and inquiries came in from interested parents in all parts of the county as to how soon the tests could be given in their schools. The audiometrician moved from school to school as quickly as possible, but it took approximately a year and a half before a hearing test had been given to all of the 16,000 school children in the county.

An initial screening test was to be given with the Western Electric 4B Speech Phonograph Audiometer, using twenty ear phones, this number later was increased to forty, and the two digit record number 91692. The follow-up test for those children who showed a loss of nine decibels or greater in grades one to six and a loss of six decibels or more in grades seven to fourteen was to be given on the Western Electric Pure Tone Audiometer. The county already owned the 4B audiometer and a pure tone was borrowed from the state and used until such time as a 6B portable was purchased.

Factors to be considered in administering such a program were, first of all, the number of children in each school; the size of the respective classes; facilities available in the school for testing, e.g. whether to use the classrooms with the regular seats or whether to use libraries and auditorium stages with tables and chairs. The audiometrician preferred the latter method inasmuch as it lessened the accident factor and helped to prevent damage to ear phones and other equipment. Copying was prevented by strict supervision by the nurse and the audiometrician. Still other factors to be con-

sidered were: (1) how to conduct the testing program without interfering too greatly with the routine of the school; (2) what advance preparation would be necessary to acquaint the administrator and the teachers with the conditions which should prevail in the school in order to insure successful testing results; (3) how many recess periods to have per day and when to have them; (4) how best to minimize the noise elements, such as recess and physical education periods; (5) how many children to test at one time; (6) what to do about the dismissal of the primary grades and the kindergarten; (7) how to rearrange the schedule for the physical education classes so that the noise would not interfere with the testing; (8) should they plan to dispense with the regular bells; (9) could they shut off the ventilating units if they made a noise in the testing room; (10) what instructions should be given the custodians as to the type of work which could be done near the testing room; (11) whether or not children in the first and second grades should be tested with the group audiometer using the monitor system; and (12) having found the children who had significant hearing losses, how best to care for them in order to determine what caused the loss and, that difficulty having been surmounted, what procedures should be followed to have the remedial work done.

After the plans had been completed and the procedures established, the health coordinator called at the office of each administrator to acquaint him with the methods to be employed in the administration of the testing program and to leave the blanks furnished by the county schools office for the recording of the tests. Questions at the bottom of the blanks relative to the hearing history of the child were to be filled out by the teacher or the nurse for the primary children and by the students themselves in the upper grades, the high schools and the junior college. In order to expedite matters it was decided that each student should take pencil and test paper with him to the testing room. The health coordinator also suggested that some health instruction on hearing be given the children prior to the testing so that the tests would be a learning experience. These lessons were to be taught using the State Health Series on the various grade levels and were to be supplemented by posters and other visual materials. Information relative to the conducting of such lessons was discussed by the health coordinator at a meeting which was held in each school for the administrator and his staff. At this time the entire faculty was acquainted with the methods of conducting the tests and emphasis

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placed on the need for quiet in the building during the time the tests were being given. Following this call, mimeographed instructions were sent out from the county schools office to all administrators and principals giving the details of the entire case-finding procedure. These instructions stated the purpose of the test, stressed the need for quiet in the building during the testing periods, suggested (1) that primary children dismissed while the rest of the school was in session be accompanied to the door by the teacher and urged to leave the grounds as quickly and as quietly as possible; (2) that teachers in rooms adjoining the testing room should assign seat work so that writing on the black boards and oral recitations would not interfere with the testing; (3) that all bells be silenced for the duration of the testing period and rung by the administrator upon signal from the audiometrician that the test for a particular group had been completed; (4) that a maximum of twenty children could be tested at one time; (5) that one recess of ten minutes duration be held for the entire school as near as possible to ten o'clock and repeated again at eleven o'clock; (6) that physical education periods be dispensed with unless the grounds were so situated that access could be gained to them and activities carried on without disturbing the testing program in any way; (7) that the highest grade in the school be tested first and that from those who passed the hearing test a group of monitors would be chosen to assist in testing the primary children.

The county health officer, working with the county superintendent of schools, had secured from the State Department of Public Health, the promise for otological diagnostic clinics to which children who were found to have significant hearing losses could be brought for examination and recommendation for treatment. These clinics were to be staffed by local otologists who were members of the American Board of Otolaryngology and who, after having been approved by the Ventura County Medical Society, had been appointed to the clinics by the advisory committee of the State Department of Health under whose jurisdiction such matters had been placed. Funds to pay the otologists were to be supplied by the health department of the State in the same manner as was done for other clinics held under the crippled children's program. The supervising nurse of the health department was to be present at the clinics to confer with the parents regarding the recommendations for treatment made by the otologist. School nurses and those from the health department who gave service to schools not having their own nurses, were to be present at the clinic and were to be

in the room at the time of the otologist's examination of the child so that they could hear the recommendations for the care and treatment of the child and could with definite authority later discuss the remedial work with the parents. After the testing program for their school had been completed, the nurses conferred with the audiometrician regarding the children who were to be brought into clinics; home calls were made to acquaint the parents with the fact that the child had a hearing loss and to secure the promise of the parent to accompany the child to the clinic. Since all this procedure was new to all the nurses, a meeting was called by the coordinator of health upon consultation with the supervising nurse of the health department. At that time the audiometrician was asked to explain the case-finding techniques, the methods to be employed in getting the children to the clinics, the type of questions to be asked of the parents regarding the hearing history of the child and the type of the follow-up work it would be necessary to do in an attempt to see that the recommendations made by the otologist were executed. Otological forms supplied by the State Department of Health were discussed and instructions given as to the best method of obtaining the information desired and how to record it so that it would be of value to the otologist. Special emphasis was placed on adequate histories inasmuch as they were considered by the otologists to be of prime importance in making a diagnosis. The audiograms were discussed in detail and the significance of losses in the various ranges explained. Western Electric Audiograms were used at first, our own were developed at a later date. Information regarding the type and amount of child's loss was considered necessary before the nurses could go into the homes and discuss the matter with any degree of intelligence. Administrators, teachers, school and health department nurses all were greatly impressed with the magnitude of the undertaking and pledged themselves to lend their unfailing support to insure the success of the program.

About a month before the case-finding program was to be conducted in a school the audiometrician contacted the administrator and arranged for a suitable date on which to start the program and made all other plans necessary for giving the tests. In each of the elementary schools the upper grade children were tested first. From these groups, ten to twenty students, the number chosen depended upon the accommodations offered by the testing room, were selected to act as monitors to assist in administering the tests to primary pupils. The choice of monitors was made from those

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whose tests showed they had good hearing and who, in the estimation of the administrator or teacher, had high enough scholastic standing so that they could take time away from their academic work to help with giving the tests, and whose citizenship showed them to be worthy of this responsibility. Prior to giving the tests to the younger children, the audiometrician explained the testing technique to the monitors and brought in the first group of primary children who were to be tested. To this group, the audiometrician gave a simple explanation of the test, described the way in which the numbers were given on the record by the fading voice technique, then gave two trial tests to acquaint the children and the monitors with the entire procedure. A monitor was assigned to assist each primary child. He put the ear phone on the child, wore one on his own right ear to keep track of the place in the column where the numbers belonged and recorded the numbers which the child he was assisting whispered to him. The monitors quickly became so proficient in aiding with the test that the audiometrician had the additional task of keeping them in line so that they would not assume responsibility for proceedings. Testing of the primary children having been completed, the remainder of the students, starting with the third grade, were tested. If time permitted, all papers were marked by the audiometrician before she left the school and arrangements were made to retest those who had a loss of six to nine decibels or more, depending upon their grade placement. If possible retests were made upon the same day. Care was taken to see that the child used a different ear phone and, in the case of the primary children, that a different monitor was assigned to assist in the child's retest. After using the monitor system for a year it was decided by the audiometrician upon consultation with the health coordinator to discontinue that method of testing and to do sweep frequency tests on the 6BP audiometer. After this latter test, those who showed losses greater than the ten or fifteen decibels at which the machine was set, and the setting depended upon the noise factors encountered in the school, were given a diagnostic test on the same instrument. A check on this method as compared with the monitor system showed that it did not consume any more time than the group testing and was more indicative of the type of hearing loss which a child had.

Children from all grades who were found to have a loss on the group test were then given a pure tone audiometric test on the 6BP. A monitor, one of the upper grade boys or girls, if in the elementary schools, was asked to assist the audiometrician when

she gave the tests. It was his duty to go to the room and ask the teacher to send the children who were wanted by the audiometrician to the testing room. He was instructed to keep the children quiet when approaching the testing place and not to enter the room until a child came out, indicating that there was a break in the testing. Three children at a time were in the testing room and when two had been tested they returned to their classroom and the monitor went for two others and brought them to the audiometrician. The pure tone test was usually started on the right ear unless a better performance had been given on the group test with the left ear. The frequency 1024 was used as a starting point, going up to 8192 then back to 512 and down to 128. A very brief explanation as to what they were to listen for was given the children and in the case of the primary grades, particularly after the sweep frequency testing began, the audiometrician took the pure tone into the classroom prior to the testing and demonstrated it for the children. They listened to the tones at full amplification, heard them decrease in volume and learned how to respond when they heard a tone. It was a game to them and as a result no child had a fear of the unknown when it came his turn to be tested.

Reports on all tests were prepared by the audiometrician on forms originated by her and the coordinator of health. Copies were sent to the health department, the administrator, the nurse, and the educational coordinator. The original was filed in the office of the health coordinator and a copy was retained by the audiometrician. It was from the list of those who showed a loss of twenty decibels in any two frequences in either ear that the selection of clinic cases was made. This selection was made by the audiometrician in consultation with the coordinator of health, the nurse and the educational coordinator. Information contained in the files of the county schools office was made available at all times to the coordinator of guidance, nurses, administrators and teachers. Following completion of the testing program and compiling of reports, the audiometrician called at the office of the administrator or principal and returned the group testing sheets to him. She also presented him with a copy of the report of the group and pure tone tests, and discussed significant findings on individual children. Conferences of this type proved to be very valuable, for many cases of children who appeared to be dull or even stupid, who were extremely nervous, who were constantly under strain, who were indifferent to class activities going on

around them, the cases of non-readers, the cases who were falling behind in their class work, those who were discipline problems, those who were exceptionally retiring, could frequently be traced to the fact that the child had a loss of hearing. These conferences served to make administrators more alert to the possibilities of children having a hearing loss and caused them to request that many new students who entered after the testing program had been completed in their school be given an individual test. As a result of these many requests it became necessary for the audiometrician to establish office hours in the office of the county superintendent of schools and to test these individual cases by appointment. The children were brought in by the parent or by the school nurse who had secured permission from the parent for the visit. The parent contact was desirable inasmuch as it provided an opportunity for the audiometrician to consult with the parent regarding the child, to explain the type of loss if the child had one, and also to tell about the clinical services. In cases of severe loss, the audiometrician gave an immediate appointment for the clinic, then relayed the information to the nurse who made a follow-up call at the home to obtain the necessary information for the otological record. The director of guidance, in an effort to rule out physical disabilities on cases where she had been asked to make psychometric examinations, requested that sight and hearing tests be given before she saw the child. These cases were usually brought in to the audiometrician during her office hours unless she was planning to test in the child's school in the immediate future.

The remedial portion of the program, of course, was placed in the hands of the County Health Department. In the beginning, two otologists were appointed to conduct clinics in the county. At first, only two clinics a month were held, the number later being increased to four as another otologist was added to the approved list. The day and the time for the clinics were agreed upon by the otologist, the supervising nurse of the health department and the audiometrician. The audiometrician then conferred with the nurse who was to bring children into the clinic, gave her the list of children who had qualified for such an examination, explained the necessity for having a parent accompany the child and gave her the otological blanks supplied by the state which were to be filled out in quadruplicate. These blanks gave necessary information such as name, grade, and age of the child, the name of the parent or guardian, some comment on the child's scholastic

ability, and a report on the child's health history. It also stated whether or not there was any history of a hearing loss on either side of the family. Following a home call by the nurse and the completing of the blank, it was turned over to the audiometrician who then entered the results of the audiometric test made at the school during the initial pure tone testing program and also those obtained just prior to the clinic. At first this later audiogram was made at the clinic, but due to noise and other factors unfavorable for obtaining a reliable test, this was discontinued and all tests were made in the school a day or two previous to the clinic.

Ventura being essentially a rural county, there were many problems which confronted those in charge of the clinics. One of the most difficult was that of transportation. Accordingly, after securing the promise of the otologist to cooperate and after having discussed the project with the administrator, several clinics were held in the schools. Mothers were more amenable to the idea of attending the clinic when they found they had only to come a few blocks to the school instead of having to travel thirty miles or more to the office of the otologist. School nurses, assisted by members of the P.T.A. who acted as receptionists and furnished transportation for those parents who lived at a distance from school or who had small children, and by the older girls of the school, planned well and worked diligently to assure the best of working conditions for the otologist. Reviewing the situation after the first clinic, the administrator and the medical and educational staffs agreed that this method was a satisfactory solution to a very difficult problem.

Children selected for examination at the clinic had, upon examination on the pure tone audiometer, shown a loss of twenty decibles or more in two or more frequencies or a loss of thirty or more decibles in any one frequency in either ear. In a few cases where extenuating circumstances existed, children with a less degree of loss were brought in for examination. Usually this was done at the special request of a parent, a teacher, an administrator, or the nurse.

At the clinic, the nurse in charge of the children and the parent were present at the time the child was examined by the otologist. After reviewing the history of the child and scanning the audiograms, the physician made a complete examination, checked the ears for wax, perforated ear drums, indications of otitis media, etc. The sinuses were illuminated where such a process was indicated and a survey of the condition of the nasopharynx, nose and throat

was made. If conditions so indicated, Weber and Rinne tests were made. All these findings were deemed useful in diagnosing the child's difficulty. Sometimes a recommendation for a Wasserman and sedimentation tests were made. Temperatures were checked, chest X-rays for tuberculosis were recommended, sex hormones prescribed and T&A's advised. In addition mastoidectomies, radium and X-ray therapy to the naso-pharynx have been recommended as treatment which might be instrumental in improving the hearing of the various children. The parent, having listened to and observed the thoroughness of the physician's examination, was well prepared to consult with the supervising nurse from the health department, who also was present at the clinic, to ascertain what, if any plans, the parent may have made for taking care of the remedial work. In addition to discussing the remedial work, certain information asked for at the bottom of the otological blanks was filled in by the nurse during her conference with the parent. If the work was to be done by a private physician, a copy of the report was forwarded to him so that when he saw the child he would be cognizant of the case history and what had been recommended by the examining otologist.

If the parent stated that she would be financially unable to take care of the necessary work, provisions were made to have it done at the county hospital provided the family was able to meet residence requirements and was in other ways eligible for assistance. Those referred to the hospital clinic by the supervising nurse were interviewed by the medical social worker and referred to the proper agency for care. Crippled children's services have made it possible for those children whose parents have limited finances to have medical care which would require treatment extending over a prolonged period and which would require an extensive outlay of funds. If there was no possibility of funds from the latter service or help from the local agency, the school or health department nurse, who serviced that particular school in which the child was registered, would be called in and an attempt made to get some local organization to assist in the remedial work. Perhaps this entailed the purchasing of a hearing aid or providing funds for a T&A or whatever was needed to assist the child in overcoming his handicap. Some children, of course, needed no immediate attention and the otologist asked to have them put on a list to watch and recheck again at a later date of anywhere from six months to a year.

Parents of those children who showed a significant loss in the

speech range and for whom the otologist recommended speech reading and/or a hearing aid were interviewed by the educational coordinator for the hard of hearing. This latter position was filled by the County Superintendent of Schools when results of the case finding program produced enough children who had sufficiently marked hearing losses to warrant the formation of speech reading classes in the various schools through the county. The educational coordinator, in addition to setting up the educational program, held conferences with the various administrators and made plans for holding the necessary classes for those children who were in need of instruction. In-service training of teachers was given to assist the classroom teacher in identifying behavior symptoms of the hard of hearing child and to acquaint her with the factors involved in speech reading.

Monthly meetings were held with the speech teachers and the director of guidance in order to develop the most helpful procedures for giving speech reading instruction. The speech teachers were shown the audiograms of children in their classes who had hearing losses and the cases discussed in a conference attended by the educational coordinator, the speech teacher and the audiometrician.

The educational coordinator also arranged conferences with parents at which time the problems of the hard-of-hearing child were discussed with the hope that a greater understanding on the part of the parents might be obtained regarding the problems of the child and that more help would be forthcoming for him in the home from parents and siblings.

Several hearing aids were procured by the coordinator of education for use in the county office. These were used to demonstrate the advantages of a hearing aid for those whom the otologist had suggested might profit from its use. The educational coordinator worked with the child after he had been fitted with the aid and worked with the parents so that they would have a greater understanding of the problems faced by the child who wears an instrument. She also talked with the teacher concerning the time and the length of time the student should wear the aid while in school. Such counseling did a great deal to help a child overcome many of his inhibitions regarding the wearing of an aid and served to give parents a greater insight into the problem which a child faced when required to use one.

In addition to the regular testing program in the schools, the audiometrician, working with the officers of the district Parent-Teacher Association, arranged for testing pre-school children.

Publicity was prepared by the county schools office regarding this very new undertaking, a place in which to give the tests was arranged for by the local P.T.A. committee in charge of the program, appointments were taken by them for every fifteen minutes in the morning and the audiometrician was successful in administering pure tone tests to a couple of hundred children. Children found to have marked losses were recommended for immediate examination by an otologist. Those children whose parents did not follow-up on the suggestion, were retested when the audiometrician visited the school in which they were enrolled and, if the results still indicated the need for an otological examination, the nurse made arrangements to have the child brought to the clinic. Results of these pre-school testing programs proved that they were very beneficial and well worth the time spent in their administration. Rechecks on those who had remedial work done were most satisfactory.

Children who were examined at the otological clinic and for whom remedial work was done but whose hearing loss was still existent after a period of time has passed were returned to the clinic to see if there was any other method of attack which could be employed to check the loss of hearing. These cases were serviced in the same way as the regular otological cases and information regarding them was forwarded to the state department of public health, the physician chosen for remedial work, the health department and the school. Every effort was made by all concerned to assist the child with the hearing loss to have his difficulty diagnosed, to have him treated, if treatment was indicated, to give him an opportunity to develop educationally so that he could take his place in the world and become a citizen who would be a credit to his community, self-supporting and self-respecting.

While a hearing conservation program on a county-wide basis presents many problems, it has worked very well indeed in Ventura County. Cooperation among existing county agencies interested in the handicapped child has been excellent, otologists have become very much interested in the project and have cooperated wholeheartedly with those who have had the responsibility for the administration of the program. Administrators, teachers, guidance personnel, nurses, and parents, are becoming more aware of the value of and the necessity for such a program and are requesting more and more service along these lines. The results obtained

from the remedial work done for many of the children has more than justified the program from the standpoint of time and funds expended.

READING BEHAVIOR WITH REGARD FOR ENDOCRINE IMBALANCES

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Disturbances in endocrine function are common among school children. Since such disturbances are commonly reflected in individual behavior patterns, it is important that teachers be able to read the behavior understandingly in that regard. This paper was prepared for the purpose of helping to develop abilities for that type of reading. I should like to state that my training and approach to these problems have been entirely from the standpoint of endocrine medicine. Having had no special preparation in either psychology or psychiatry, my terminology may be unfamiliar to you. Hence your indulgence in that regard will be appreciated.

The endocrine system, as it is recognized today, consists of a number of highly specialized tissues which control the entire biochemistry of the human body. These tissues have been named "glands of internal secretion" or "ductless glands." They pour the complicated chemical compounds which they elaborate directly into the blood stream and not through ducts, as do other secretory glands.

Probably the most important of these ductless glands, and certainly the one with the most varied functions, is the pituitary. To this bit of tissue, smaller than a cranberry, some eight to sixteen different functions have been ascribed. For the purposes of this discussion two are worthy of particular mention. They are: (1) the fraction controlling growth, and (2) the fraction responsible for bringing about sexual maturity at the proper time.

The thyroid gland is next in order as regards the level of its placement in the body. The thyroid tissue, consisting of two lobes connected by an isthmus, lies directly below the larynx. It has as its function the elaboration of a substance which is known as thyroxin. This hormone's function will be discussed in detail later.

In the fibrous wall or sheath enclosing the thyroid are found the parathyroids. These are multiple bits of tissue whose function has been repeatedly demonstrated when surgeons either by accident or by incompetency remove this sheath when removing the thyroid. The result of such surgery is inability on the part of the patient's chemical laboratory to maintain a normal level of calcium. The resultant drop produces tetanic spasm in the skeletal muscle tissues. This disturbance was a common cause of death in the early days of thyroid surgery. Fortunately, however, modern medicine has available ways of substituting for these tissues.

The adrenals are two separate glands lying on the upper poles of the kidneys. Each consists of two distinct types of tissues, viz.; the external or cortical portion, and the internal or medullary portion. The cortical portion produces a hormone essential to life. The lack of this chemical substance produces the disease known as "Addison's Disease". Fortunately, here again, modern medicine has both a synthetic and a concentrate derived from animal adrenals which are very effective as substitutes for the natural hormone. The medullary portion elaborates the well known substance known as adrenalin. This hormone will be discussed later in this paper.

The gonads, consisting of the testes in the male and of the ovaries in the female, are responsible for the development of the individual's secondary sex characteristics and for the functions of reproduction. For the purpose of discussion of behavior aberrations, the production of estrogen in the female and of testosterone in the male are of importance.

In the pancreas there are multiple islets of secretory tissue which are known as the Islands of Langerhans and which produce insulin. Underactivity of this tissue results in Diabetes Mellitus. Over activity will be discussed later.

There are other tissues to which have been ascribed certain functions, but since the matter is still open to question, they will not be considered in this discussion.

Now, to consider the imbalances of these individual tissues' production of their various chemical hormones. Let us first consider the production of the one responsible for growth. It is a simple incontrovertible fact that any radical variation in height from the age-group average in childhood and adolescence will usually result in the individual's so affected receiving a certain amount of extra "ribbing", which commonly ends up with such nicknames as "runt" or "big palooka", etc. I recently saw a boy of fourteen who had the physical stature and appearance of an eight-year-old. The boy had

a better than average intelligence, and consequently was an advanced student. He was in classes with 15 and 16 year-olds. From the age of eleven to thirteen he had become more and more on the defensive, refusing to enter into any form of physical activity or sports. During the past year he had run away from home on three occasions for no other reason than to avoid going to school. Also, he had ingeniously figured out that if he could simulate the appearance of a severe cold he could avoid school. He accomplished this by painting his throat with merthiolate, a dye, and inhaling a little pepper. This boy's behavior was not, as was suggested by a psychiatrist, due to an abnormal character trait, but was due to his inability to compete with other individuals with whom he was constantly required to associate. He was found to be suffering from a mixed deficiency of the pituitary growth fraction and thyroxin. From the standpoint of this deficiency of his thyroid hormone, this boy, although he had had 14 birthdays, had the tissue maturity of an eight-year-old and, consequently, the maturity of judgment close to the same level. Here he was being forced to compete with children approximately twice his age on the basis of mental maturity and physical stature. Common sense would tell you that he is going to build some mechanism of defense, or some means of compensation. Fortunately, his deficiencies are correctible; and given a reasonable degree of understanding and consideration, he will probably establish a normal behavior pattern, and attain the place in society to which he is entitled.

On the opposite extreme the problem of overgrowth is met. This is not a common problem and consequently deserves only brief consideration. When it is the result of a deranged endocrine function it can result in psychological disturbances which may change the individual's behavior pattern. It is seen most commonly in girls. When present their compensation may be and usually is one of intentionally stooping, or slumping. This results frequently in posture problems which, unless the underlying factors are understood and treated early, may result in permanent skeletal changes which no amount of exercise or training will eradicate. This overgrowth can be the result of a number of complicated mixed endocrine imbalances and these are too complex to discuss in view of the more important and more common sources of aberration in behavior which will be presented.

A discussion of the relation between the normal development of secondary sex characters and their relation to behavior must be considered, even, if only briefly. Most physical education instructors

have been confronted with the unwillingness of certain children to disrobe in the presence of other children of the same sex. While there are probably many other factors involved, a common one is a discrepancy in degree of sexual development of which the individual child is keenly aware. There is the problem of girls who refuse to appear in bathing suits due to under average development of breast tissue. Boys whose pubic hair and beard growth are obviously under average for their age may show similar tendencies. That these are endocrine imbalances is beyond question. The compensations these individuals make and the resultant problems in adjustment and behavior are too numerous and too complex to discuss. Suffice it to say that the background source is endocrine in origin and commonly amenable to treatment.

Probably the most common source of departures from the expected average behavior in children is the result of thyroid deficiency. Here we are dealing with a structure which produces that hormone responsible for allowing every cell in the body actually to oxidize or to burn fat, carbohydrate or protein products at body temperature. We are prone to overlook the fact that every cell in the human body is carrying on this oxidation process at from 98 to 99 degrees. To accomplish comparable oxidation outside of the body would require temperatures of from 160 to 900 degrees.

This function of oxidation is important at all stages in life. A decrease in the output of thyroxin of, say, 20 per cent will result in a decrease in circulatory efficiency and of heart and energy output by the same amount. The effect of this in a given individual may appear in any tissue or combination of tissues dependent on what happens to be the weakest link in that individual's chain. The effect of such deficiency on behavior in children is three-fold. First, on the higher centers of the central nervous system. There is a proportionate slowing of reflex time. The response to incoming stimuli is slower. Whether the portal of entry be through eyes, as in reading written words; or through the ears, as in hearing spoken words; the student will respond more slowly than would be the case if the output of thyroxin were better related to body needs. Abilities to perform motor writing or motor speech will likewise be affected. And the ability to store new knowledge in memory will be handicapped. Here we find one of the fairly common school problems, the child whose performance is definitely below his intelligence level. You have all seen children with an I.Q. of around 130 whose performance, perception and acuity are considerably below that

which you would expect from that level of potential intelligence. These children almost invariably are deficient in thyroxin.

Second, the effect on the motor nervous system results in poor ability to develop muscle coordination for skilled performance. Ability to compete in skilled athletics, in the arts and in mechanics may be reduced.

Third, we have the effect of this deficiency on the level of heat and energy output. There is a proportionate decrease in heat and energy output corresponding to the degree of deficiency in thyroxin output. This is reflected in premature tissue fatigue both motor and nervous. On the motor side we find individuals with the same size and bulk of muscle and skeletal structure as the average but who are unable to compete physically due to the early onset of fatigue. On the central nervous system side there will be a reduction in application time.

In addition to the function just discussed, thyroxin, the hormone from the thyroid gland, has another highly important function during the years prior to complete adult maturity. This is the control of the rate and degree of maturation of tissue. To understand this completely, let us consider that we all started out as a one-celled organism. Once the female ovum is impregnated by the male spermatazoa there is contained therein the entire potential adult structure. From the moment of impregnation to the time when complete adult development is attained the rate of maturation is in proportion to the level of thyroxin present in circulation fluids. This is a distinct and separate process from growth, which is primarily one of increase in size and bulk of the structure and has no direct relation to maturity. This is most easily demonstrated by dwarfism where we may have an entirely complete normally functioning adult structure even though only one-third the average normal expectancy as to height and weight. If, then, there is a normal level of thyroxin during these years we can expect a ten-year-old child to have the degree of maturity normally expected at this age level, both physically and mentally; dependent of course on other factors such as hereditary intelligence, absence of brain damage before, during or after birth, etc.

Now, let us consider the child of ten who has had during these ten years a level of thyroxin sufficient only to result in a degree of maturity normally expected at six years of age. This deficiency may or may not, and commonly does not, result in a decrease in physical bulk or size. Let us assume that the child has been able to maintain average progress in regard to grade. Here he is in competition in

every way with children whose judgment, interests, social relationships, etc., are on the level expected at age ten, when his own maturity in these respects is at the level of age six. It should be readily apparent that this discrepancy will reflect itself in his behavior. His attempts to compensate for this difference may take any one of numerous paths. He may isolate himself from all children or he may seek the companionship in sports and activities of children more nearly his maturity level of six.

I am sure you are wondering how frequently thyroid deficiencies occur in sufficient degree to produce these results. A number of years ago, a study was undertaken of all the children in the first four grades in Santa Barbara County schools. Out of 660 children, slightly more than 18 per cent were found to have a thyroid deficiency sufficient in degree to result in two or more years retardation in maturity. As important as establishing the high incidence of this metabolic deficiency was the finding that 75 per cent of all problems of behavior, performance, and social adjustment were with children who fell in this 18 per cent group—a ratio of 3 out of 4!

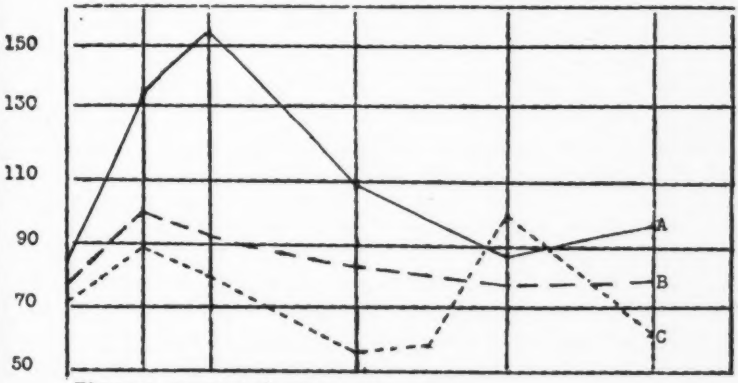
There is another endocrine imbalance which is a combination of a primary thyroid deficiency accompanied by an increase in output of insulin with consequent excessive storing of glucose and resultant periods of lowered blood sugar. A very common and most striking result of this form of endocrine imbalance is an altered behavior pattern—and it is the most difficult to handle intelligently unless the underlying physiology is understood. Since this problem requires much more time than is available in this discussion, it will be given only brief attention. However, it is my hope that I can give you a sufficiently clear explanation of the underlying physiology so that when you see it—as you most certainly will—you can recognize it as a primary *physical* imbalance—*not* a primary *emotional* one.

The maintenance of a constant level of glucose in circulation is to a large extent dependent upon a balanced production of three hormones—thyroxin, insulin, and adrenalin. There are other factors, such as dietary intake, absorption, storage capacity, and ability to get at stored glycogen. However, for the purpose of this discussion, we can limit ourselves to consideration of the first three. Thyroxin may be considered to be antagonistic to insulin. In other words, an underproduction of thyroxin may result in either an overproduction of insulin or an insulin effect out of proportion to that expected from the amount produced. The reverse is true in overproduction of thyroxin. For this reason, 40 per cent of individuals with toxic goiters develop Diabetes Mellitus, if the overactivity is not corrected.

Excessive insulin output may be the result of thyroid deficiency or a natural compensation for this deficiency. Regardless of which of these two is responsible, the end results are essentially the same; erratic, unexplainable abnormal behavior with intermittent periods of normal behavior and possible average to superior performance.

To illustrate quickly what physiologically is producing this situation, let me point out the actual levels in blood sugar which are found to be normal and the levels in two groups which are not normal in this regard.

The chart presented herewith is intended to portray the normal blood sugar curve following an average meal and only those aberrations from normal which pertain to the subject.



Figures represent mgms. per cc.

Curve (A) is average normal and behavior aberrations in this group are rare. Curve (B) is the thyroid deficiencies in whom the overproduction of insulin has not occurred. Behavior problems occur in this group but are on the basis of lowered heat and energy output and slow maturity previously discussed. Curve (C) represents the children we are considering at this time. In this group blood sugar levels may drop to anywhere from twenty to forty per cent below those levels normally found after four to twenty-four hours fast. When blood sugar drops below sixty-five milligrams per cubic centimeter, the human protective mechanism exerts itself and pours out adrenalin in order to withdraw glycogen from storage, convert it into glucose, and restore a normal level of blood sugar. In so doing, this mechanism has far reaching effects in that

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the adrenalin then places the entire neuro-muscular system on a basis where responses to incoming stimuli become purely automatic. Consequently, when this happens in the individual, his responses to incoming stimuli are out of his control. He becomes highly irritable, irresponsible, and incapable of using his normal judgment in any way.

With adrenalin in circulation his response to incoming stimuli is so fast that he loses the ability to use higher centers to temper his response. In other words, judgment, education, training and any other source of control are apt to be completely eliminated. He will wonder after such an episode why he handled a situation in the way that he did. There is no reasoning that will explain to him why he did, other than the fact that he was acting automatically. If anyone stood in front of a potential landslide or flood and suddenly the potentiality became a reality, he would react with that situation automatically. His behavior would be similar in that respect to that of the person abnormally affected by adrenalin. Here it is a normal physical response to an emergency. The reaction is one of fear, self-preservation, and escape. Whereas, in the individual we are considering, the reaction is repeatedly occurring and is caused by an aberrant physiology resulting from an out-pouring of adrenalin under circumstances that are entirely different. He may be sitting quietly and with no immediate emergency, yet his entire nervous system is immediately placed under conditions that rule out his ability to use the degree of judgment which he may have developed and which forces him to respond purely automatically.

The possibilities of departures from normal expectancy in behavior with this biochemical imbalance going on are almost limitless. It would require an indefinite period of discussion and research to work out the multiplicity of changes in behavior which this one complicated imbalance in endocrine function alone could possibly produce. This does not by any means exhaust the behavior symptoms related to endocrine deficiencies, but it is sufficient to indicate why teachers must know how to read pupil behavior as an index to the well being and the educational potentialities of individual pupils.

A MULTI-SENSORY APPROACH TO READING

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In April 1947, I talked with the Elementary School Principals Association at San Diego on "Education for a New World" and my comments were published in the February-May issue of The California Journal of Elementary Education. For this Thirteenth Yearbook of the annual Claremont College Reading Conference I have been asked merely to extend and further illustrate those remarks. For the launching base of these present extensions and illustrations, the conference is, therefore, referred to that article.

My general position is that, in teaching in general and in that part of teaching focussed upon scanning the printed page and interpreting its meanings:

1. We tend to narrowly limit our research and experiment to spelling, vocabulary, sentence and paragraph structure; to the mechanics of eye movement; to analysis of material, their types, their degree of complexity, and their importance to the education and growth of children in terms of adult judgments.

2. Because of this limitation we tend to ignore and neglect much or most of the wide range of sensory experiences by which children learn and grow to understand the turbulent world inside them, the world of facts outside, and the fusion of these into imaginative interpretation of the multiform world including that portion of it that lies in the printed page.

Elizabeth Goudge in her recent novel "Pilgrim's Inn" put neatly one of the aspects of my reflection on this problem. She describes a woman's afternoon in the woods with a small boy and a girl. The children run ahead exploring and picking violets. They return to her "incredibly dirty, leaves in their hair, mud on their faces and their reefer coats, but with pink cheeks and candle eyes". The girl flings herself into the woman's arms, the boy butts his head against her. Then the author says, "Jill did not — question them. She knew how worrying, even how agonizing sometimes, the questions of grownups can be to children whose capacity for experience so far outstrips their capacity for talking about it. And in afterlife it's the other way round, thought Jill; adult and educated folks seem to experience so little of any consequence and yet to say such

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a vast and wearisome amount about it." And, of course, we say it endlessly in print as well as by word of mouth.

We must I think deepen and clarify our concept of reading printed words as only a small fragment of experiencing, of drinking in the world through the senses. It is, in fact, only a minute portion of the operation of the sense of sight. Concerning *seeing* and the power of an individual child to learn through seeing, we know as yet comparatively little. None of the best of the optometrist's or optician's instruments tell us anything about what a child really sees and remembers among the millions of things that come within his range of vision daily, nor what the things he sees mean to him. We nibble at one corner of the problem in our devising of tests of space relations, but these are primarily geared to late adolescents, youth and adults for vocational diagnosis, and at the elementary levels to simple block assemblies, picture puzzles as a factor in the measurement of "intelligence". We get another slant at the problem in our art teaching where we can catch a little glimpse of how a child sees form, color, composition if he is permitted to draw, paint and model freely and is not restricted instead to slavish and meticulous copying of models. We get closer to the core of the problem of what a child can see, wants to see, cannot see, or refuses to see in our picture or ink blot projection tests. In reacting to these he is set free to interpret, to recall, to fuse old impressions and create new imaginative ones, but, in doing so he draws upon all he has learned from his senses other than sight as well, just as he does when he reads and interprets a printed passage.

I recall talking with a small group of Eastern college women about this matter once in an informal "bull session". I asked them how they read and interpreted the simple words, "If I have four apples and add two, how many apples do I have?" the answer came thus:

A. said, "I read it as arithmetic. I see four abstractions, small straight lines in a row. I see two more line up beside them and I get a Roman VI after an = sign which transmutes itself into an Arabic 6."

B. said, "I start to think of numbers and lose them at once. I see instead a problem in genetics. I see a cross section of one apple, examine its seed, the texture of fruit and skin. I visualize its type and ancestry, the complex of cross-fertilization and the varied genes that went into its conception and growth."

C. said, "I read the statement at once as a nutrition matter, a concentration of a sort of food made up of certain combinations of sugars, starches, acids and vitamins."

D. said, "I think of a bunch of apples, lovely red with tinges of green and yellow round the stem holes. I arrange them in a dark green ceramic bowl. I place them against a velvety dark, almost black background; figure the lighting, and get ready (in my mind, that is) to take a color shot of them with my camera."

E. said, "I was hungry already, but when you said 'apple' the pangs really hit me and I could feel my teeth crunching thru the skin and into the tart sweet fruit while the juices ran over my tongue. Let's go to lunch."

F. said, "I see apple trees in bloom. I smell their fragrance. I think of the story of Johnny Appleseed. I think of the trees bare, of trees in bloom, of trees loaded with fruit. I think of all of them in the moonlight. I want to write a poem about them, and about the lovers who come together because of them."

G. said, "I read the problem and I think not of six apples but of millions; of itinerant laborers and their families like the Joads in "Grapes of Wrath" sweating out their lives for little pay, never still, moving from place to place. I think of our free enterprise system, of its vast organization, its means of distribution, its place in world economics, of the old struggle of capital and labor and the resolutions of the struggle being worked out now."

Seven college women reading an arithmetic problem familiar to every elementary teacher in her arithmetic units with seven markedly different results! And had the elementary teachers who taught these young women as children been wise enough, they could, perhaps, have identified then the astonishing differences in sensory learning among them, could have steered their *reading* of life and the interpretation of experience to far richer and more vital comprehensions. For it is to be noted that not a single one of these women ran the whole gamut of understanding and interpreting. Without discounting the value and validity of each of their points of view, their syntheses of experience, it is still obvious that a full "reading" of the simple problem would have included all seven "meanings" and many, many more. What, I think, we must have is extended research in the diagnosis of individual pupil's *selective seeing*, of which reading printed words is but a fragment.

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As with seeing, no audiometer, no measure of vibrations per minute, no whisperings at 5, 10 and 20 paces can begin to determine what a child hears. His world is full of an infinite range of sound from the whisper of a faint breeze in dry grasses to the blow-torch roar of a jet plane immediately overhead; from the faint music of happy self-created songs lilting in his inner ear to the full volume of a mighty orchestra playing the "Emperor Symphony" over the radio with the sound turned up almost to blasting; from the gentle purr of his mother's sewing machine or the tick of a wrist watch to the roar of diesel-electric giant locomotives as he clutches mother's hand on the station platform or the rattle of pistol, rifle and machine-gun fire or the boom and echo of artillery and bomb in his Saturday afternoon movie; and from the soft croon of muted voices of relaxed and warmly friendly people to the tense hysterical mouthings of people full of fright, anger and hatred. The way in which a child *listens,* what he hears and what he shuts out from his hearing, what he remembers of what he hears for a lifetime and what he forgets at once or buries in his unconscious, and how he interprets these in relation to all of his other sense impressions, all determine how he will interpret the words he reads.

For example, I am of the opinion that only those who *hear* drama, poetry and, if you will, foreign languages can *read* any of them with rich or adequate understanding and can learn accordingly. I am deeply conscious of this factor in my own learning. I recognize myself as one who learns through his ears. I remember most vividly the things that were *read aloud* to me in my childhood or that I had the chance to read aloud to myself, sometimes pacing up and down in the garden behind my childhood home, book in hand, spouting the paced sentences of prose or the measured lines of poetry, or the rapid-fire chit-chat of plays. I am aware that such residues of competence in *reading* foreign languages, French, German, Malay, and Pacific island Pidgeon English, come not at all from any brain sweat in school and college over irregular verbs, case, tense and conjugation, person or masculine and feminine endings, all or most of which were gone with the winds of living very shortly after I had passed the examinations and had my grades filed. That competence comes from having heard taxi drivers and cooks, landladies and clerks, children and scholars, fellow officers and native chiefs and their women *voice* their meanings with accompanying posture, gesture of the hands, shrug of the shoulders, smile on the lips and laughter in the eyes. Any word I read in one of these languages is approximately meaningless to me unless I rehear

it in my inner ear, in effect roll it over my tongue, or can recapture how my landlady in Algiers or an Eniwietok native *sounded* and *looked* as it was spoken.

On the contrary, I know that others are not like me in this factor of learning to read. I use learning advisedly since reading is a process the learning of which is continuous and never ends until death or senility sets in. In these learners of reading other than me and of all ages, other modes of experience are paramount. As a child I knew other children, and as an adult I know and have known intimately many whose sensory intakes are strikingly different from my own. Each has his way of reading. Some delight in the sight of words strung into sentences. Grammatical structure and rhetorical devices and imagery are to them "logical" matters. They fall into patterns the dislocation of any part of which blocks understanding. Their memory of tenses, constructions and the like is flawless. Their reading vocabularies are extensive and their literal translations from the printed page impeccable. They get A grades. They pass university language examinations for the higher degrees with ease and honor. But many of them cannot order a meal, direct a taxi, ask for a drink of water, or make professions of friendship or ask essential military questions in an accent, structure or intonation that brings the needed answers. Some, of course, are lucky enough both to see and hear what they read with stops wide open. But, I think, until teachers are able to distinguish between students who learn reading best through selective seeing and those who learn through selective hearing and can provide materials and methods for both, we shall not teach reading well.

What of the approaches to reading through the other senses than sight and hearing? The direct approach to the problem through the touch of the fingertips as in the reading of Braille by the blind, or the learning thus of children non-readers by much the same method, are already familiar to this Conference. But beyond these far too little has been done on how children and adults of all ages experience and interpret their worlds through the nerve endings in the skin. To me the word "dog", among many other meanings, brings most vividly the feel of a cool, moist muzzle in the palm of my hand and of the bone structure of the skull under a mobile skin beneath soft and deep, or short, wirey and bristling hair. Quite differently, as my reading went as a boy, "CAT" meant tactual danger for I had an allergy to the protein of cat dandruff. If I stroked a cat I knew that simultaneously painful and itching hives would break out on my skin wherever I had touched her and I was

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in for mother's scrubbing with strong soap and an application of powdered soda. As I said in the earlier article, "Like primitive man, but with an extension and sensitivity and interpretive power far beyond his, we learn our world through our fingertips (and other skin areas) and when this sense is well developed it carries children on into advanced (reading and) the skills" of the sculptor, surgeon, musician, typist and many another.

How many teachers of reading are able to sense in any given child the intensity of his learning, the vividness of his experience, the depth of recall and the connotative associations he brings into action from smells and tastes? A child's world teems with odors and savors he brings to interpret the words in his books and the broader reading of experience of which print is but a part. There are the smells and tastes of the candy kitchen, the bakery and medicines when the doctor comes; of steak and mashed potatoes to satisfy a sharp-edged appetite after a hard day of play; of mother's lipstick combined with the odor of her hair, flesh and "store" perfume as he snuggles in her lap to be read to; of the sweat of his own body and of the soap and steaming water that cleanses him. Nose and tongue seem to me to be the least recognized, most neglected of our potentially rich aids to reading. In the adult world, only the perfumers, the makers of deodorants and the florists play up the appeals to the one and the food processors to the other. And scientific studies have been largely confined, like those of Havelock Ellis, to the bearing of these senses on sex relations which seem to be also the basis of the advertisers treatment of these products. How else does a grownup read the blurbs on halitosis, "BO" and "grand allure" perfume?

Kinesthetic learning for many pours a wealth of meaning also into what they read. What is children's "restlessness" and "squirming" in the classroom but an index of wanting to experience, grow and learn by the pull of nerve and tendon and the push of muscle in an infinite variety of body movement that gives life and meaning in its turn to reading. In our school halls, on the playground, in gymnasium and swimming pool, the ball diamond and the football field, on slides and bars and ropes, teachers of reading can find some of the ways children read on the page such words as "fighting, tumbling, running, dancing, panting, squeezing" and a host of others.

Several, perhaps all, of these basic senses blend into another of the utmost importance, I think, to learning to read. It is a complex which we might call time-space and timing sense. It has many

aspects. How can we come to know how children learn to read and understand the meaning of a second, a minute, an hour, a day? When and how do they extend this sense to comprehend a month, a year, a century, a light year? How can they find meaning in "one-millionth of a second"? or interpret the Golden *Age* of Greece or the *Age* of Chaucer? What do "now" and "then", "past" and "future" mean to them? Children read units on child life in China, on the early Indian tribes of California, of possible human life on Mars and future space ships to get there. How do they learn to link the right space to the right time to the right people? And how can they read aright if they do not so link them. How can we teach them to make such connections?

The sense of timing we recognize but still know too little about as we approach the process of reading through the senses. We have an idea of it in music wherein the reading of notes has bound up in them an essential understanding of 2-4 and 3 quarters time and the like. We glimpse it in the dance in the differences between one-step, waltz and polka. We know it better in sports where a fraction of a second too late or too soon in the swing of bat or racquet, the throw or kick of a ball, means fouls and duds and misses. In the special field of the teaching of reading we increasingly study and comprehend the concept of timing in all our explorations of reading "readiness" in children. But, it seems clear that, until we know much more of how children read life through all their senses in order that we may know how they interpret the meanings of words and symbols they read in books, our judgments of both reading readiness and proficiency must be little more than guesses.

But this question of timing and readiness extends itself into all aspects of living and perhaps, most importantly, into relationships with ourselves and with other people and therefore deeply into our interpretation of reading about people. How we and others succeed or fail, enjoy or suffer depends heavily upon whether we are too early, or too late, or "on time", and upon whether we are in or out of synchronization with the hundreds of varieties of rhythms to which we are required to adapt ourselves. When we are out of timing with ourselves the days "drag" and we find "time heavy on our hands" and are "bored". When our inner time selves are synchronized the hours "speed by on wings".

The timing of our actions that affect others is productive of much of what seems good or ill to us. Acting too slowly and behindhand, our children are branded by us as "tardy" or "lazy". Procras-

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tination is a damning characterization and is indeed the "thief of time". By hasty action we "press our strokes", psychologically we "over-react". Semantically we operate on the "thalamic level". And always we fail to gain our ends and meet with frustration. A potential lover is alienated by a kiss too soon and bored by one too late. Some writers and artists live miserable lives and die not knowing at all of future glory because they wrote or painted "ahead of their time". A product put on the market too soon or too late makes no profits.

It would seem then that the future teacher of reading would increasingly try to understand the variant sense of time-space-circumstance relationships in those she teaches and to learn how to improve the operation of this sense and its concomitant, timing. She would have among other goals (1) the interpretation of the printed words in terms of social meaning in this frame of reference; (2) improvement of insight into each child's own sense of these relationships and how his may vary from that of any other, and (3) instruction in the methods as well as the rewards and benefits of improved timing in social relationships. Once a teacher possesses this concept, her teaching should be more effective and much enrichened. She can illustrate from material read how characters in a story, poem or play fail because they are too early or too late, and how the hero is the hero because he always arrives and acts "in the nick of time".

What I mean to imply by all of this must be obvious. I do not imply criticism of past or present teachers of reading any more than I would criticize my grandmother for not driving a hundred horsepower automobile or for not cooking with electricity, or than I would criticise myself for not learning to fly a supersonic plane. Rather I want to imply that talk of "going back to the good old days and teaching reading as one of the 3 R's" as I was taught it in childhood is sheer idiocy considering what we know now about how children learn and how to teach reading. I want to imply too that it is equally silly for us to feel that present methods and practices and knowledge are final and perfected. I have tried to suggest, as educational observer and humble philosopher groping my way, that we might make progress in teaching children to read if we take a multi-sensory approach especially to the connotative and interpretive aspects of reading without, meanwhile, neglecting to extend our explorations of mechanics, methods and processes. All these should, I think, take on new breadth, depth and meaning if we think of reading in terms by no means limited to the sight of

words but rather in terms of what this sight of words recalls and creates in the body-mind-emotions of the child who reads as forged out of what he has seen, heard, tasted, smelled, touched, felt kinesthetically and in that complex and subtle sense of time-space-circumstance and timing.

How else can our children of today learn to read the masses of print our presses pour out for word consumption in these times? How else can we teach them to interpret, appreciate, enjoy and adapt to (as our world soldiers of the recent war had to do) the nature of the frozen arctic wastes, the heat of deserts, the swelter of jungle; to the concepts of atomic fision for destruction or the building of a comfortable and prosperous world; to speeds of neutrons in a piece of ice and to those in a beam of light from a star in a galaxy never seen or known before the development of a giant telescope in their own time; and most of all to people of many nations, creeds, races and colors into whose relationships with these children of America they must read alienation, hatred and endless conflict and destructive war, or unity in variety, friendly understanding and peace.

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MOTIONS AND EMOTION: RHYTHMICS AS AN APPROACH TO AREAS OF READING

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The definition of reading used throughout this paper is the definition which is accepted as basic in this conference, viz.; reading is the process of making discriminative reactions.

In this sense, it is reading which is the ultimate goal of the teaching of any school subject inasmuch as development of the child's ability to make discriminatory responses is equivalent to the development of all of the child's abilities. The quality of teaching of any school subject may thus be measured by the degree to which the child improves in this reading ability.

This paper attempts to explore the use of rhythms as a possible

approach to a form of physical education. The purpose of the described method is to develop new areas of reading environmental factors as well as to enable the child to read his own personality.

Even in the "dark ages" of education when teachers were supposed to restrict their endeavors to the transmittal of formalized knowledge and academic skills, they were nevertheless confronted with the whole personality of the child. They would have been unable to teach reading, writing and number work without affecting the child's emotional life, stimulating his interest, arousing his enthusiasm or planting contempt and hatred of knowledge.

It all depended upon the basic, but at that time largely unconsidered, personality of the child. The effects upon the development, whether beneficial or deleterious, were purely accidental.

In this more enlightened age of scientific progress, generations of psychologists, psychiatrists, sociologists, and educators have recognized the importance of the emotional functions for the development and health of the child. Indeed, the significance is now accepted as most important for the welfare, and even the very existence, of nations and, possibly, for all mankind.

We are concerned, therefore, with the question whether or not the development of emotional functions should be made a part of the educative process. We take it for granted that it is one of the aims of the present day educators to develop new methods for the best preservation of the mental health and for the most favorable growth of the child's personality.

Emotional experiences are the very core around which all of our attitudes are formed. Their quality, rigidity or flexibility, strength or weakness determine not only the organization of the single personality but may also influence the structure of a nation and perhaps decide its destiny.

Emotional Education Through the School Program

In the American school program, social studies have been made the frame of reference in which the formation of emotional attitudes has been placed. It is because of their importance in the training of citizens that their efficient application became a matter of great concern and research. Thus, modern educational procedure constructs the curriculum most frequently around the core of social studies. Therefore, affective experiences must be taken into consideration in almost all the phases of a good school program, even

if they are not planned primarily for the satisfaction of the emotional needs of the child.

Teaching of social studies depends to a great degree on printed matter which brings needed information to the child. Much time, therefore, is used by children in deciphering printed pages. It is difficult to understand and to love something with which one is only indirectly acquainted through the printed page. This applies even to adults. Events which are known only through print soon lose vividness and color or, at least, soon become shadowy and unreal. Studies which prove that direct experiences are always deeper and longer lasting than indirect experiences are numerous. This is true especially for children because so much of their attention is diverted from the related event to the technical mastery of reading printed words.

Dance and music are experiences which touch the emotional core of the child. He learns to experience, to understand, to read the very people who created the dances and the music, instead of deciphering printed sentences.

The Development of Emotions. The process of maturation leads through phases of emotional turmoil. Anxiety, anger, aggressive tendencies, guilt, impulsive love and sympathy are part of every child's life. Not all of these emotional experiences can be utilized for social purposes, or, as we say, sublimated. There is in every child an emotional surplus, which is most frequently expressed in the form of aggressive tendencies. If the outlet for such surplus is blocked, repression may cause anxiety and produce a predisposition towards psychoneuroses or character defects with subsequent delinquency as the usual consequence. Emotional release (catharsis) is said by many to be one of the prime functions of the school. Adults and adolescents can achieve such a catharsis through *verbal* release but children are known to be poor verbalizers. Neither the child who is mentally well nor the child who is in need of therapeutic help can clearly express his feelings through words. Actions are for the child what words are for the adults. This is the reason why psychotherapists had to replace the free association method used with adults with play-therapy in their work with children. (Melanie Klein, Anna Freud, David Levy, and others.)

Psychotherapists of various schools gave thought to the problem of how far therapeutic results can be achieved without the child's understanding of his own motives. The therapists who are outside the circle of psychoanalyst and even a great number of modern child psychoanalysts (Anna Freud and her followers) are cautious

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in their interpretation of the child's impulses to their young patients. In making interpretations one may sometimes arouse feelings of guilt and anxiety and do harm to the child. The playing out and acting out of the child's impulses and the whole gamut of emotions which accompany them are usually regarded as sufficient for the therapeutic effect. Rogers and his followers, Axlein and others, have shown that during the playing out of a conflict a clarification of the problem may occur. The individual learns to read the situation, and also his own role in it, without outside interferences or interpretation and often without even his own verbalization. A similar process often occurs during rythmics and dancing. While the child expresses his own emotions in the form of rythms and dances he also learns to read himself in his life situation. To afford this probability is one of the great advantages of the described method of physical education.

Art Activities in School. In school, arts and crafts and, to a lesser degree, musical education and dramatics provide channels through which the child may release and, hence, express his emotions. Modern educational methods utilize paintings, drawings and ceramics not only for the development of esthetic appreciation but also for this very purpose. In addition, new and exclusive methods of emotional release have been introduced into the school program. The better known examples of this are finger painting and the psychodrama. The rationale of these methods has been said to be a more immediate expression of repressed emotions because very little material media are needed in their use, thus reducing the diversion to technical matters to a minimum. The greater the technical problems of handling expressive media, the more attention must be directed toward the solution of those problems, and the more restricted and impeded is the *free* flow of expressive activity.

The above mentioned methods are certainly of great importance for the emotional release as well as for the transformation of purely emotional attitudes into social attitudes. However, it is the contention of the writer that there are still simpler methods of release. Their source has been rather rarely utilized as far as general systematic education is concerned. This contention is based on the fact that neurophysiological studies have shown that spontaneous and imitative motions have a beneficial effect on release of both free and repressed emotions. (Darwin, Wundt, Dollard, and others.) It is the writer's opinion that one of the tasks of the school is to encourage the use of the child's own body for his expressive needs.

Motion as a Means of Expression. All human beings express

their emotions involuntarily and unknowingly through the movement of their bodies. The physiological association between motions and emotions is seen in the tenseness and relaxation of the muscles and in the facial and postural display of emotion. It is also evident in the hypermobility and agitation of sadness and in the immobility of deep despair. It is revealed in the explosion of anger and the attack of aggression, in the shivering and restlessness of fear and anxiety and the blind flight of panic.

Another fact which shows that motions are the natural media for the expression of affects is implied by the form and derivation of words. Emotional states are expressed in all languages through words indicating movements. Some examples taken from the English language are "e-motion," to "ex-press," to "recoil," "outgoing," "withdrawn." We say that we feel "high" or that we are "bowed down" with sorrow, that we feel "jumpy" while anxiously waiting, or that we "shrink away" when we are afraid or that we "blow ourselves up" with pride.

Movement, as expression of emotion, is not restricted to the human species only. The same forms of emotional expression are noted in higher mammals where the same laws of muscular control, of tenseness and relaxation, function in the expression of emotional attitudes. The higher we ascend in phylogenetic evolution the easier we can read the animal's affective state by looking at it. We are able to see the rage of a dog or the grief of a monkey.

In human beings, dance appears at first as a form of volitional artistic expression of emotion through motion. All primitive tribes link their dance to their religious ceremonies. In our civilization the dance has lost its ancient signficance as a ritual but has not lost anything of its importance as a form of emotional expression and release.

Artistic use of the expressive qualities of motions are also the basis of all dramatic play including its modern and most popular version, the movies. The emotional release which these arts provide would be impossible without the use of expressive movements. We would be unable to read another person's emotions without understanding the language of the human body.

General Principles of the Teaching of Rhythmics

The teaching of physical education in the elementary school is usually restricted to the playing of games.

When well directed, such games provide opportunity for vigorous exercise in fresh air and a good deal of fun, both of which are

of immense importance for the healthy development of the child. Moreover, there is ample provision for the release of aggressive and cooperative impulses. The range of emotional experiences is small. Physical education, as it is taught today, does not permit the release of emotional needs of the individual child, as may be the case in art activities.

Several prejudices make it difficult to use physical education as a vehicle for the child's emotional experiences. These prejudices are concerned with the methods of education and with the necessary qualities of the teacher. They include, for instance, the restriction of free movement, as used in dance and rhythmics, to the female sex and the over-estimation of games as a method of education for citizenship. Free movements used as an expression of emotions and taught as a part of the body building program are usually called *rhythmics*. The teacher's role in rhythmics is the same as in the teaching of art. It is not always the greatest artist who is the best teacher of art. The teacher of young children should neither show the child how to express himself through the use of art, nor should he even volunteer any explanations. If he violates this rule he stifles in the child the possibility of expression. Children draw and paint in an entirely different way than adults. They do not perceive in the same way as adults nor do they share the same interests, aims and goals. Children do not reproduce their environment in their drawings; they are neither interested in perspective nor in the correct proportional relationships. They draw, for instance, big heads and little legs because the head has more meaning for them. The function of the art teacher, therefore, is restricted to the choice and provision of the material which best brings out the child's creative ability. She explains the use of such material, she encourages him, and she opens his eyes to the wealth of colors and forms. In addition, she attempts to awaken emotional reactions to both form and color. Indeed, it is of greatest importance that the teacher does not show any movements to the child. Imitation of a movement is imitation of another personality and hinders rather than develops the child's ability to read and fulfill his own need for movement and for the expression of his personality through his movement.

The same rules apply to the teaching of all expressive media. The basic rules for the teaching of rhythmics are analogous to those of other art activities. These rules may be formulated as follows:

1. The teacher abstains from all negative criticism, and does not show what to do or how to do it.

2. The teacher stimulates the child in such a way as to make him aware of the infinite variety of the possible movements of his body.

3. She makes the child conscious of the fact that the body is an expressive tool and that there is a connection between movement and feeling.

Adaption of the Rhythmics Period to Sex Differences

In our culture, boys and girls are taught early in their lives to differentiate their behavior according to their feminine and masculine roles. Girls are instructed to play with dolls and to look neat and pretty, boys to be hardy and aggressive.

Expressive movements of boys must be directed in such a way as not to interfere with their masculine role. The teacher has to be more cautious in the choice of suggestions given to boys than in those given to girls lest she be accused of teaching them "sissy stuff." Ceremonial dances and folk dances, short dramatizations, jumping and running, and the execution of simple rhythms either with or without the accompaniment of a rhythm band supply an infinite variety of approaches which usually are enjoyed by all children regardless of sex.

In the experience of this writer there has never been any lack of interest on the part of the boys as far as rhythmics are concerned. There may be some children of both sexes who prefer to use every physical education period for games only. As children should not be forced to express their emotions, the decision of a child to play games instead of taking part in rhythmics should be respected.

The Function of Rhythmics as a Part of the Education for Citizenship. Rhythmics are apt to develop constructive social motives if the teacher provides for all of the children a constant change in the role of leader and follower, if active and passive attitudes are frequently varied. There should be a constant give and take of suggestions by the children. These suggestions are not expressed in words but are either emotional stimuli, or they are furnished through the playing of an instrument. Rhythms are executed in one of three ways: by a group of children with one of them taking the lead; by two children whose movements supplement each other; or by one child alone with the class as onlookers.

The Introduction of the Rhythmics Program. The most difficult phase in the program of rhythmics is its introduction. Rhythmics should be introduced gradually and should occupy at first only a

fraction of the time devoted to physical education. It is the experience of the writer that it is most advantageous to begin with five to ten minute periods given on every other school day, and to continue this schedule for one month. After the first month, two weekly periods of thirty to forty-five minutes are designated as rhythmic periods.

There are three possible approaches to the study of expressive movements; namely, the use of free movement (skipping, running or jumping); the use of sound; and finally dramatization.

Skipping, running, jumping, turning, galloping, tip-toeing, etc., can be permutated in endless variations as the child is well acquainted with these movements. The teacher should not demonstrate, but she should use verbal suggestions for the combination of such movements. More complicated movements should be developed from simpler ones.

The child should experience a variety of possible motions. He should become acquainted with his own muscle play and the flexibility of his joints and with the feeling of tension and relaxation.

Since, in our culture, children usually are too tense, relaxation has to be emphasized.

Dramatization is a valuable help because it centers the child's attention on something outside of his ego. It helps him to understand the teacher's suggestions and it appeals to his interest and to his joy of play. Imitations of movements of different animals, like the jumping of a frog, the flying of a bird, the galloping of a horse, are good examples for very simple dramatizations. Later in the year these simple dramatizations should be built up to more complicated ones, with more accurately specified roles which may demand a greater precision of expression. It is preferable that the suggestions for the dramatizations be given by the children.

The Use of Sounds. Percussion instruments greatly enhance the appeal of the rhythmic period. Any instrument can be used for beating the rhythm, either a commercial one or such as can be made in school. In the experience of the writer, the best are tambourines or small drums. The instruments can be used by the children without previous introduction or training. Rhythms are played by the children as accompaniment to the motions of other children. Either the instruments can lead or suggest movements or the rythmic play of the body takes the lead and suggests the rhythm to the child who uses the instrument. Tonal music should be used sparing-

ly because it restricts the variety of possible movements. It can and often does restrain the expressive powers of the child instead of liberating them.

On the other hand, music brings the maximum enjoyment to the children and is excellent for the culminating activities. Short rhythms executed on the piano by the teacher and folk dances are best adapted for use in physical education.

Folk dances should be composed by the children, since the teacher should not show any movement to the children. Such dances are best composed as a group enterprise. The music is played to the children and every child tries to find his own solution for the rhythmic expression. Children who have found the best solution for a theme are called upon by the teacher to show it to the other children. The other children take up the movement, they may either repeat it or vary it. The children work on the theme until an interpretation is found which is acceptable and enjoyable to everybody in the group.

The composition of dances should not be undertaken until the children have had some training in rhythmics and the teacher has had some experience with the particular group. Before attempting to compose a dance, some research should be done by the class and by the teacher. Pictures of dancers executing the particular dance can be shown, or an appropriate movie may be presented to the class, or other aids may be employed. It must be explained to the children that they should not attempt to copy what they have seen, that all folk dances are executed with innumerable variations, and that the studies have been made only to make it easier for the children to find their own solution.

Summary

A greater use of music and free bodily expression in the teaching of physical education has been advocated. It is the contention expressed in this paper that emphasis on these special areas of reading would have the following advantages:

1. It would give the child the opportunity to satisfy his own emotional needs; to utilize his need for physical expression for the liberation of pent up emotion; and it would satisfy his need for movement.

2. The child would learn through the use of music, rhythms and dance to understand the people who created those art expressions and who expressed their very being through these arts.

3. It would provide for a better understanding of music through musical experiences than heretofore.

Division III

Reading Things Which Affect Human Behavior

"For a long time it was the common custom to think only very literally and rather stubbornly of anger as merely anger, jealously as jealously, love as love, hate as hate, awkwardness as awkwardness, bullying as bullying, and so on to the end of the chapter. Today, many of us know that these behaviors are signs, symbols; and that by understanding their symbolic character we become intelligent, better read human beings, and more understanding of human nature, and so more understanding of human beings, and more serviceable and helpful to them."

Laura Spencer Portor
(Anne Bryan McCall)

READING THINGS WHICH AFFECT HUMAN BEHAVIOR

INTRODUCTION

In an editorial in the Woman's Home Companion of July 1936 (reprinted by permission in the Eleventh Yearbook Claremont College Reading Conference) Anne Bryan McCall pointed out, "Human behaviors are of course not haphazard things. They are signs and symbols. They have definite meanings." Her discussion of "The Meaning and Reading of Symbols" as presented in this yearbook amplifies and illustrated that concept further. Better reading of signs, both personal and conventional, is a primary aim of functional instruction in reading.

One hears often such expressions as the "colors clash" or the "colors harmonize" but there seems to be much less awareness of color as a *dynamic* factor in one's environment. The yearbook committee is pleased to be able to present two excellent treatises on the reading of color as a factor affecting human behavior.

Audio-visual aids to learning have been publicized widely of late. Dr. McClusky calls our attention to the fact that such "aids" must be *read* as are the more established materials for instruction. Varied types of reading performance are required for the many types of materials. "Differentiated Reading of Films" must be learned if the use of films is to be made functional.

Further discussion of the reading of things may be found in the preceding yearbooks of this series. Volume 12 contains a section on *Reading the World*. Volume 11 treats of reading color and the radar oscilloscope. The earlier volumes contain articles on many other aspects of such reading but all copies have now been distributed and the volumes are now out of print.

THE MEANING AND READING OF SYMBOLS

Laura Spencer Portor
*("Anne Bryan McCall")**

The understanding and reading of symbols is always enlightening. Like the ability to read the printed page, it gives the mind immediate enrichment, and a sense of freedom. To the person who can read the printed page a "closed book" is never finally a closed book. It can always be opened and read, each time perhaps with a fuller and better understanding. So too, with the reading and understanding of symbols, the mind attains not only fuller freedom, but definitely a greater sense of security. One soon comes to understand that symbols, like words, are a large part of the reading of life. Indeed an awareness and understanding of symbols is one of the most important parts of education.

Just what is a symbol?

It is a sign, an association—a sign *of* association; an evidence of likeness and relation. It always stands, as a word does, for something more subtle than itself; as a flag does for something far more than itself. The mere word "flag" stands for a certain kind of object; but the flag itself is a symbol because it stands for, represents far more than the mere staff and cloth of which it is made. It stands for all the associations of courage, loyalty, bravery, fidelity, and many more that have clung about it for ages. The letters of the printed word are in themselves extremely small, seemingly insignificant; but grouped into words they have power to rouse beautiful or terrifying associations; they can move us and stir the mind and spirit. So it is with symbols.

Symbols are made of the very truth and truths of life. Break any symbol open and you will find that its heart is an abiding truth of life. The British soldiers, for instance, in the darkest hour of battle, cry "Saint George for England!" and at the heart of that is the fact that very long ago a hero, later called "Saint George", a hero in England, really did fight and win and bring deliverance against terrible odds.

(NOTE: Some paragraphs in this article are taken from "YOU YOURSELF: AN INTRODUCTION TO GENERAL PSYCHOLOGY" by Anne Bryan McCall. The Treasure-Tower Publishing Company, Garrison, N. Y.)

The symbolic phrase "the sun rose" has as its kernel of truth that men in the long unscientific ages really did believe that the sun "rose," got up in the morning in the same literal sense that they did.

Our symbolic terms "good morning," "good day," "good evening," "good night," are records of the fact of the many and varied dangers by day and night which have long beset man; and a record too of the friendliness of man in wishing that his fellow man might escape these dangers, that he might have *good* mornings, *good* days, *good* evenings, *good* nights.

"Good-by," our abbreviation of "God be with you," is a symbolic record and reminder of the perils of the road and the longing of the human heart for those it loves to be guided and protected.

The act of offering your hand in greeting has back of it whole ages of man's insecurity and his fear for his life, and so of his habit of carrying weapons; and it testifies no less to his willingness to give up carrying weapons if it be safe for him to do so. Indeed the symbolic meaning of hands meeting in greeting might be said to be the original agreement of disarmament. For each hand outstretched says by that outstretching, "It is safe to deal with me. I bear no weapons." This was the ancient first meaning of handshaking.

Thousands of examples could be given, if there were space, of similar deep truths hid in symbols. But perhaps enough has been said to show that the ability to read and understand symbols is one of the most enriching privileges that life offers us.

"Geniuses are by common consent," says William James, "considered to differ from ordinary minds by an unusual development of association by similarity." By this term "association by similarity" James means a tendency to see and associate the analogies or likenesses or similarities, in other words, to see and use symbols.

This relatedness of all things, these likenesses and analogies, are of the very essence of symbols. When I say a crow is a thief, I note and call attention to the likeness between the crow who without permission takes another's possessions, and the man who does the same thing. When I say a child is "a perfect little magpie" I recognize the similarity between the child's normal habit of chattering, or its innocent passion for appropriating objects for the mere pleasure of acquisition, and the same behaviors in the magpie. If I say someone gave me a "stony stare" I am associating, and showing that I associate, the cold, hard, unblinking, unrecog-

nizing look the person gave me with similar cold, hard, unblinking, unfeeling and unrecognizing qualities of stone.

Though the power to see and note likenesses is seen in its highest degree in genius, as in Homer, Dante, Shakespeare, yet it is the common possession of each one of us. If, therefore, we are slow to see likenesses and relationships in life; if we are poor in the use of symbols and in the reading of them, it is because we have not discovered and claimed our great heritage, or because circumstances and environment, and lack of the higher forms of mental and spiritual education have robbed us of it.

If we note with accuracy and nicety the relations of symbols to the things they represent, we definitely enrich the mind. We enlarge its powers. We extend its vision; we multiply its associations, we add precision to its vision; we teach it to *read*. If you see in the dawn for instance, little but the time of day, you are less mentally and psychologically rich, less "literate" in a large sense, than the poet who associates it with many beautiful facts and likenesses and emotions, and who writes

"Dawn, in the white wake of the morning star,
Came furrowing all the Orient with gold"

or than Shakespeare when he wrote,

"Full many a glorious morning have I seen
Flatter the mountain tops with sovereign eye"

or than Chaucer who said beautifully, associating dawn with his heroine in the "Knight's Tale",

"Up rose this dawn, and up rose Emilie!"

It is always helpful in studying symbols, to study the works of those who use them abundantly and delicately and exactly, as Homer and Shakespeare do, for instance. Read these authors and mark the symbols they use, and you will soon see why symbols are so large a part of such writers' greatness, and why people have loved these men for so long, and honored them for their wisdom, their insight, their awareness of life and their sympathy with it.

But, besides the symbols in life and books and daily thinking, there is the marvelous inexhaustible heritage of the symbols and symbolism of behavior. For a long time it was the common custom to think only very literally and rather stubbornly of anger as merely anger, jealousy as jealousy, love as love, hate as hate, awkwardness as awkwardness, bullying as bullying, and so on to the end of the chapter. Today, many of us know that these behaviors are signs, symbols, and that by understanding their symbolic character we become more intelligent, "better-read" human

beings, and more understanding of human nature, and so more understanding of human beings, and more serviceable and helpful to them.

We know for instance that shyness is not merely shyness; it is a sign of some burden of embarrassment, some lack of ease of the mind and spirit; we know that jealousy is a sign or symbol of an unpursued, unfulfilled desire for better things; or it might be a symbol or sign of a profound discouragement or self-distrust; we know that malicious gossip, calumny, is a sign or symbol of cruelty or disappointment suffered, which has resulted in a desire to hurt or harm. We have learned to think of the behavior of the man who "takes to drink", as the symbol or likeness of the behavior of a man who "takes to his heels"; who is in flight, trying to escape. From what? That will depend on the circumstances of his case. It may be a flight into forgetfulness of things hard to bear; or a flight into false stimulation, with the hope of gaining strength to bear them better. Often it is a flight from self, or from disappointment—disappointment in self, or in someone else; a broken faith or a lack of faith; but in any case it is a symbol of flight, of a desire to escape.

It is only when we begin to understand the deep race-laws of symbols and the ancient race-habit of thinking and speaking in symbols, that we begin to understand what such common daily behaviors really mean, symbolize, represent, stand for. It is only then that we really begin to understand ourselves and others; that we begin to open and read the profound book of human nature, human behavior, human possibilities.

And all of our broader, deeper interest in the meaning of human behavior, is in its turn, a symbol and sign of a more and more constant desire to understand one another, and so a symbol and sign of better, kinder brotherhood.

And all this brings us to the great universal symbols, the race-symbols, which belong to all of us in one form or another, and which therefore unite all races, like a common and universal race-language. I mean the great race-festivals, age-old; such as the great religious festivals of Spring, for instance, of Easter, celebrating the return of the human heart to hope, after darkness or suffering; or the festival of appreciation and the mind's and heart's gratitude for benefits received and for the bounty of life—festivals of Thanksgiving; and that other festival to celebrate courage restored and faith renewed; the coming down of heavenly goodness and mercy to save men from despair, the coming of a Messiah. This festival

in Christian lands is particularly rich in symbols and symbolism. It holds within it likeness and associations concerning man's struggles and his hopes, his patience and his faith, his dignity, his reverence and devotion and his simplicity as well as his glory. A particular star is set in the heavens as a sign and a guide. "Kings of Tarshish and the Isles" led by it come bringing gifts, out of the ages. Herod, a symbol of all that is evil and dark, a symbol of denial, attempts to turn their journey to his own advantage; but they arrive nevertheless at the place of their intention. Shepherds and their sheep assemble from nearby pastures. Heavenly ministers lead and guide them to a humble place full of glory, where they find a little child who for nearly two thousand years men have called "The Hope of the World", "The Light of the World."

To understand, and deeply read, such symbols is not only to increase our faith in life; it is to live more intelligently, more hopefully; it is to be better informed, better equipped, better read in all those things that make life worth living; it is to be more efficient in any work we are doing, more capable in any service that is vouchsafed us.

There are many ways of cultivating love of symbols and their meanings: by reading much poetry, for poets see more likenesses than other people, and use more symbols; by the study of words and their derivations, to associate the full meanings of words with what you read; to remember, for instance, when you read that ants swarm, that bees and people do, also. The French word for ant is *"fourmi";* the French verb "fourmiller" means behaving like ants ("ant-ing") or swarming as ants swarm. Our word "capricious" comes from the Latin and Italian "capri" meaning goat. To be capricious is to change position quickly, unexpected, in an unpredictable manner, as a goat does. The wind never really rages, nor howls, nor moans, nor shrieks; but we speak of its behaving in these ways because we have heard dogs and wolves howl, savage creatures rage, human beings moan and shriek.

As you study symbols and learn to read them you will note more and more likenesses and analogies in life. This will make you more understanding, more sympathetic. That person is more sympathetic—better equipped for life who knows and remembers that all the world, animate and inanimate, is bound together by likenesses and similarities.

A tree is straight and strong, noble and dependable. So is a man if he has certain tree-like qualities. How many things do you know who have in them a similarity of tenderness?—The human

heart, the little breeze at dawn, a cherished memory, a certain type of song, an inflection of the voice, a touch of the hand. How many things can you remember off-hand that are merciful? God, of course; anyone of great power to inflict hurt, but does not, even under provocation use it; rain after drought; release from suffering; forgiveness, the dew:

"The quality of mercy is not strained,
It droppeth as the gentle dew from heaven."

Emerson is as great a lover of symbols as Shakespeare or Homer. He often uses them to sum up briefly in a last paragraph what his whole essay is intended to say. In his essay on "Illusions" he strives to prove that all is order in the universe, no matter what illusions, fears, dreads, circumstances may blind man to that fact. To make it all clear, he sums it up in symbols in the last paragraph, and leaves it with you. After reading it you never forget the gods sitting there on their thrones, offering gifts to man, let him be never so troubled and bewildered with troubles, follies and illusions, and continuing to offer them. It is vivid, beautiful, worth reading, worth committing to memory. The person who loves it has a treasure for all time, plus a new faith in life:

> "There is no chance, no anarchy in the universe. All is system and gradation. Every god is there, sitting in his sphere. The young mortal enters the hall of the firmament; there is he alone with them alone, they pouring on him benefactions and gifts, and beckoning him up to their thrones. On the instant, and incessantly, fall show-storms of illusions. He fancies himself in a vast crowd which sways this way and that and whose movements and doings he must obey; he fancies himself poor, orphaned, insignificant. The mad crowd drives hither and thither, now furiously commanding this to be done, not that. What is he that he should resist their will, and think or act for himself? Every moment new changes and new showers of deceptions to baffle and distract him. And when, bye and bye, for an instant, the air clears and the cloud lifts a little, there are the gods still sitting around him on their thrones—— they alone with him alone."

There is Emerson, one of the greatest of minds, reading life through symbols, and setting them out for you to read. They call to you. They say "Read us! Understand us! We are Truth!"

There is a story of Buddha which is a beautiful symbol in itself; a symbol of understanding awareness of life. It runs as follows:

> "Where others walked, they heard no voice calling them; but where Buddha walked he heard the gold in the earth crying out to him, 'Here I am, Buddha! Use me!' "

READING THE COLOR ENVIRONMENT

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Of all the subjects for discussion in art, the one we hear most about and, strangely enough, the one we know the least about is color. Color is a term much bandied about. It has been presented as probably the most aesthetic aspect of all phases of painting. But, for this conference, I should like to avoid treating it from that standpoint. I shall talk about color purely from the standpoint of its practical aspect, i.e. as something intimately and dynamically related to our daily lives.

First of all color is strictly a relative experience. There is no way to experience color except as it is experienced in comparison with other color. If everything in the world were of one color, no color would be sensed. There would be nothing with which to compare the color to make it discernible.

If you accept this premise, you find yourself on the way to understand why it is necessary to *arrange* color in order to get the most out of it. Since color is sensed only by relationship, one must avoid thinking of it as something some part of which one likes, but other parts one rejects. For example, some people like red. Some people like blue. Some like yellow. Others dislike orange, etc. We must come to think of color as being something so relative that it is never the same for even a moment or two.

One can take the dirtiest, nastiest brown and spread it on a canvas. It looks pretty terrible in contrast with that nice fresh canvas. Now surround the brown with a still dirtier color. Then the brown looks pretty good, because by relating it with the other color you have made the brown a more interesting color. In this same vein, I think it was De Vinci or perhaps Raphael who said he could paint the highlights on a Madonna's cheek using the mud out of the gutter, provided he had dark enough pigment to go with it. This meant that he would simply lower the scale in which he paints, and having dark enough tones he could make that brown, muddy color look like a cool highlight on the Madonna's cheek. Unfortunately, he didn't have the range of pigments with which to demonstrate the truth of his statement.

The limited range of pigments affects a painter much as the limited range of the piano keyboard affects the pianist. The keyboard is limited to a definite range of tones. To the pianist's left

the keys are adapted to produce tones which are about as deep as the human ear can distinguish. The range is from the deep tones to high tones which are again difficult to distinguish. The piano is made in such manner that when played it produces tones of calibrated differences throughout that range. It is really a very simple instrument adapted to serve human ability to read certain sounds.

Pigments work in much the same way. Black in the pigment range is comparable to the deep tones of the keyboard range of the piano. White is comparable to the high tones at the other end of the range. But, unlike the piano keyboard which has calibrated steps throughout its range, pigments range through perhaps a minimum of five thousand separate colors, but the order is similar. There is the same necessity for colors which hang together, which make a "good sound to the eye" i.e. a good appearance as there is for tones which when properly put together sound well to the ear. Some paintings for example are "keyed high." They stay in the top two or three octaves of the pigment "keyboard." Some paints are keyed low. They are comparable to deep bass music—boogiewoogie—I suppose.

So, there is a range which is experienced when one thinks about color. One must think where a color is pitched. What kind of a color it is. In addition to values of dark and light, there are also intensities and brilliance to consider. One experiences gray color or brilliant clear color.

There are three primary colors, viz.: red, yellow and blue, from which all other colors are mixed. Every other color known to the human eye is made from these primary colors. There are, similarly, three *secondary* colors which are produced by mixing the respective pairs of primary colors. In other words when yellow is mixed with red, orange is produced. Orange is a bright color. It hasn't been grayed or adulterated. It is a clear, fresh color. Similarly, when red is mixed with blue, a very beautiful purple is produced. If yellow is added to that purple, it is immediately grayed. If not much red is added, the color will be gray green. By increasing the amount of red one gets over into dark green and eventually into terra verte or an earthen green. Thus, one may have cooler greens or warmer greens. So it is with every color.

The mixing phase of color production can be reduced to very scientific terms. Paint manufacturing companies accomplish their mixtures by formulas, not by someone's eye or by guess. Great mixing wheels are used which literally whip the colors together

into very carefully specified tones that are produced by formulas, i.e. exact weight and measurement. The artist must similarly order his pallette. The idea of mixing just any color with his brush using uneven amounts of the ingredients and then trying to reproduce the product is soon revealed as bad procedure. Hence, one finds the artist coming to the decision that the pallette must be ordered in a very systematic way in order to develop a true relationship with color.

In color the painter has a similar problem to that which the musician has with sound. A musician may be playing a tune with which the audience is familiar. Suddenly, he makes a mistake, i.e., plays a wrong note! He jumps and starts over. He goes along up to the same point, and again makes the same mistake. He jumps twice as far! The audience can't stand it! They don't like it!

People who have developed a sensitivity to color feel exactly the same way about a color that is "out of chord," i.e. out of tune with other colors. This sensitivity is developed by sheer practice and good observation. The trouble with most of us is that the whole world surrounds us with well organized patterns. Everything we see inside and outside, individual people, houses, goats, everything has this wonderful sensation of light beaming down on it. All things have been pulled together into some kind of pattern. One can see it. One develops a sense for it. But we haven't developed our senses adequately for color. We too often look to the bright colors, and ignore the gray colors, i.e. the calmer, quieter tones. We like certain colors because we are attracted to them. Bright colors reflect more light, as a rule. We go for those bright colors without beginning to see or to get ordered in our own mind the wonderful backlog of sustaining grays which make that color more beautiful. This is a type of faulty reading which probably occurs with every type of stimulus. The process is helped by recognizing the point I presented previously, i.e. *color is relative.*

One readily senses that the best balance for a bright color is a gray color. A balance of bright colors against each other rarely develops anything like the beauty or harmony or pleasantness that one likes to think about in color. It's that grade of gray color in contrast with any bright color that improves the integrity of the bright color, i.e. gives it quality. So much for the reading of color, as such! Now let us make some applications of color reading as applied in architecture.

In discussing color in relation to architecture, let's think in

terms of what an architect who really understands color has to consider when selecting the color for his building both inside and out. First of all, would it seem reasonable to say that the apparent shape, appearance, size, or weight of any object can be changed by the color it is painted? For example, would it seem possible that one could apparently shrink a building in size or that one could give the impression that a building has been moved as much as fifty feet merely by the use of color? These are certainly problems of reading! Every one of the suggested changes is feasible. Every one is done regularly when color is effectively used.

You are doubtless familiar with what was accomplished with camouflage. The visibility and appearance of forms were destroyed by the use of camouflage. By painting certain dark colored areas in strange contrasts of dark with light, the visible actualities of the forms were destroyed. I have many times landed from the air on fields that were so camouflaged that I thought we were certainly flying into a town. Literally until you were a very few feet from the ground, the visual distortion due to camouflage was very successful.

If the visible appearance can be so grossly distorted by the use of color, it follows that by the same means the dignity, character, solidarity, and weight of a piece of architecture can be brought out more clearly and even accentuated. The texture of the building, whether it is smooth or rough, whether the surface is light absorbent or reflective constitutes special problems. But in deciding upon the color of an exterior of a building, one has to think what that color is going to do to the nature of the building in relation to its terrain. One must consider the planting, its color and the character and size of the leaves in relation to their effects on the appearance of the building.

Inside a building there are a great many places where the problem is to create more light. Other places the task is completely to destroy the sensation of light. These assignments can best be done by color. The use of color for the control of light is far better than any other method for such control. From my professional association with architects I know that one of the greatest problems we experience is that of getting the best use of light. For example, not many years ago I did a very large high school and junior college plant. It was quite a problem because, like most school buildings the entire wall on one side of the building was in glass down to approximately four feet from the floor. No light came from any other direction. How would you go about that

from the standpoint of color? Would you approach it aesthetically, i.e. in terms of a good scheme of color that you would like if you were spending your day teaching in one of those rooms? Or would you take into consideration other factors, such, for example, as the best use of color for the control of light.

I read the problem this way. The light, let us say, came from the south exposure. The light which is useful is the light going crosswise in the room, i.e. from the window to the opposite wall and back and forth. Light reflected from the front wall is bad, because it likely produces glare. Glare reduces clarity of vision and increases eyestrain. Glare also is unpleasant to experience just as a psychological factor. Reading the room situation as indicated, I painted the wall opposite the windows in light tones. The wall to the front of the pupils was painted a dark color as rich and interesting as it could be made. This was done for two reasons, viz.; I didn't want light to be reflected from that wall, and I wanted the color to make a quiet and interesting background for the teacher. Of course, I was not thinking solely in terms of the teacher. After all stuck right in the middle of that wall were blackboards—odd shapes, strange eyes looking at one all day with those nasty frames around them!

We began this discussion by pointing out that color is relative. By painting the forward wall dark, the blackboards became merged as much as possible into the whole area. So, by means of selective use of color, we quieted a wall down, we eliminated light which would have produced glare, and we produced a much pleasanter background against which to see the teachers. Relationships are important! What is good for pupils is very likely good for the teachers. Hence, the rear wall was treated in a comparable manner. The actual color scheme varied room to room but the relationships described were used as indicated and for the reasons stated.

In planning for school use we set up as much crosslight as it is humanly possible to obtain, without artificial aids. Crosslight that illuminates the paper on which a child is working is good light. It is illuminating the paper and going on past. It does not produce a shine on the paper, which is very important. It is also important that color values be used which will give the most useful light and at the same time, eliminate in every possible way a condition of glare. Glare is one of the greatest strains on the human body. It is more than just eyestrain—it does something to one's whole thinking apparatus.

I have spoken in auditoriums where I had to face a spotlight.

This produced an effect of looking into a mass of expressionless skulls, which is both disconcerting and irritating. I couldn't tell to whom I was speaking. I had no sense of recognition. It was blinding! Knowing how important it is to feel that you understand your audience and their reactions, under similar circumstances I believe I would now walk off the stage rather than speak against such odds. Such a use of light is an insult to intelligence, to say nothing of what it does to the eyes. I think most school buildings and particularly most auditoriums are as badly designed for their purposes as anything I know. They are not equipped properly in lighting and they haven't been helped by a good use of color.

I have had many strange experiences with color while working with architects. For instance, not many years ago, I worked for some time in one of our state prisons. There were some things that were wanted to be achieved with color, because of some peculiar circumstance which had previously occurred. The buildings had been started during a certain period in the state prison board's development. At one time the plant was planned to be the most formidable prison ever built. The building included some of the safest cells you can imagine, at least when judged as to the possibility of anyone's ever getting out of them. Stockades were constructed. A "bull pen" that was a quarter of a mile square was begun. The walls were fifty feet high, two feet thick and constructed of concrete reinforced with steel. Machine guns were to be mounted every one hundred feet along the top. It really was a place from which no one could escape!

The whole plant was started on that basis. Then, due to many scandals, there was a substantial change in the personnel of the prison board and a new warden took over. It was decided that the nature of the prison life would be fundamentally altered—it would be an opportunity prison. It was the desire of the new regime to make a place where men might be rehabilitated, where men might conceivably experience hope. But, the construction was perhaps two-thirds accomplished. How could we get rid of the hangovers that were indelibly worked in to the previous structures?

It was an interesting problem to go into those formidable cell blocks and make them appear as more pleasant places to be. We used very gay color. We did everything we could to camouflage the old steel doors. They were painted as bright a vermillion as we could develop and they were blocked wide open. All the rooms which had been equipped with machine gun implacements and

bullet proof glass were remodeled. The guns and glass were removed. The rooms were equipped to make them as attractive and as comfortable as possible. Books were placed there where the men might go and where they might have their own library. This hasn't much to do with color, but it does tell something of the nature of our reading of this problem.

By the use of color the feeling of the place was changed completely. We had to use hard barren forms that were built into the structure, but we relieved their barrenness in many ways. I think you would be interested in what we did in the great dining room which originally had catwalks and machine gun nests which were poured into the concrete and could not be removed. We did a great deal toward eliminating the effects of the formidable machine and structures.

I had an amusing experience with the state architect. There was a room where the families were permitted to visit the prisoners. Under the former administration the room was arranged so that the family or visitor sat at one side of a desk and the prisoner sat at the opposite side. They talked stiffly for a matter of a few minutes and then returned to their respective freedoms. The state architect considered that room to be the most important room of all as far as psychology is concerned. He felt that color was needed to give the room the desired effect. I worked out a scheme. It was not gay, but it had a certain amount of dignity but still it was not formidable. However, when the architect saw it he said, "I think it's terrible! Why it looks like a prison!" Eventually, however, he learned to like it. There is often an association in our minds about color that we have to outgrow.

I think we frequently have associations with so many kinds of happenings and events which occur when we are surrounded with certain kinds of color that we have developed antagonisms towards individual colors. That condition is wrong. It is a case of faulty reading. You must recognize that there is no such thing as a bad color. Color is simply a matter of relationship.

On one occasion, I had a difficult experience with the school board in Alhambra. When I proposed a color plan for the new million and a half dollar plant they had constructed, the man in charge of maintenance said, "You are crazy! You are absolutely out of your head! Do you think we can send a painter out and let him try to match a color to do ten minutes worth of painting? You can't do it! You'll have to go back to the straight old type of colors." He told us he had spent a whole month the year before

in sessions discussing that problem. Brown and gray were adopted absolutely and finally.

Now that kind of thinking about color persists in architecture today. In our institutions and in our homes we go back to safe, stale ivory, pale greens, awful lady-like lettuce colors that one can't stand after one knows how much more a good healthy color would do for the room. A good color would be a foil for people. It would give them a background. A deep rich gray is the most exciting thing in the world for women to be seen against because they can be *seen,* if the gray is dark enough.

There is a wonderful theater in Paris called the Piggelty. I saw it right after it was built. The first time I saw it, I went there with one of the architects who designed the theater. The visit was in the middle of the morning so there wasn't any show in progress. The lights were turned on and I was amazed at how barren the place appeared. I was quite young at the time and I didn't have any idea at all of what the designer was driving at. The wall was very gray, but it was an interesting gray. A stairway wound in a great circle up the entrance lobby to the mezzanine and thence to the entrance of the theater. The interior finish was gray. The floor was gray. Everything was reduced to the greatest simplicity possible. It didn't look like these Fox West Coast horrors where there is "gold and garbage hanging all over the place."

That night when I went to the theater, I saw what the designer had had in mind. One could see those lovely women coming in their wonderful gowns, bright reds, bright greens, bright grays, etc. If you don't think they could be seen against that foil, you don't realize the effectiveness of contrast. People like the Piggelty! It was the most popular place in Paris!

The control of light can be greatly aided through the use of color. The control of the appearance of the size of a building can be completely accomplished by color. As I told you in a visual perception sense one can move a building backward or forward by color. One can utilize good light and eliminate bad light with color. I shall not attempt a discussion of the psychological effects of color except to say that I think it makes a whale of a difference what color you spend your life near. I say this as a result of experiences with office workers and workers in great industrial plants. Changes of as much as twenty per cent increase in efficiency and even far greater improvement in safety records have been accomplished through a proper use of color.

Not very long ago I did a very large plant. We spent several

months studying the color problem. First from the standpoint of lighting, but also from the standpoint of making the people who worked there feel a pride in the place. We found we could accomplish the assignment by doing the obvious. We painted the dangerous elements of the equipment in colors not used anywhere else in the plant. We used vivid and unexpected colors, deep rich intense pure colors. We avoided painting all walls alike or all equipment alike. The result was that the workers kept the machinery cleaner, they looked upon their tasks with more happiness and pride and their efficiency increased by about twenty per cent.

Several years ago Douglas Donaldson did an orange packing house near Burbank. He told the management, "I won't touch the job unless I can do everything. I am not satisfied merely to come in here to paint your walls and some of the equipment. I shall paint the little trucks in which the men wheel the boxes of oranges around. I shall paint the boxes, also. When the oranges come from the field and are dumped into the receptacles, I want them in color. I don't want them to be in just an ordinary box."

The management thought he was crazy. But! Ten years of operation has revealed that it is by far the most successful orange packing plant in Southern California. Everyone who works there has pride in the institution. It has attracted visitors from all over the United States. It is amazing the difference a good use of color makes. It isn't a question merely of making the color pleasing to personal taste. It is more a matter of going right down to the heart of the problem and of finding out logically, rationally, the sort of color which best serves the purpose.

Astute color reading is what is needed. I keep emphasizing this point because *personal taste* really doesn't enter into the problem. I may prefer yellow. You may prefer purple. But, we'll not get anywhere by merely stating preferences. We need to determine *why* I like yellow and *why* you prefer purple. Every color has its purpose. Some color comes toward you with a terrific bang. Other color recedes as rapidly. Other color is static. Some color is fluid. Your attention must flow from one color to another if you wish to move easily. If you wish to step your jumps in seeing in sharp clear procedure, you will change your colors with the same quality of abstract control, because this is an abstract problem.

This is illustrated by the plumage of some birds as they adapt themselves to their terrain. It's a matter of keeping alive. I think

animals work out their color problems instinctively. But we are not so well equipped in that regard.

Children from the age of about four through eight years are by nature great colorists. They don't have to be told how to use color. They love it! They won't use a bad color. The child will avoid always, almost instinctively, a color that doesn't excite one emotionally. Children have "an eye for color." They don't have to be told how to mix color. They just mix it well, naturally. But, as they grow older, as they get more conscious of drawing, more aware of the formal aspects of things; color discrimination "dies right on the vine." You can see it wilt! Color choices get grayer and thinner and more meaningless.

All primitive people love color and use it extensively. They use color brilliantly with terrific imagination and power. They use it with great contrasts of values of dark and light. They make the most wonderful designs with color. In all material with which they work, whether it's their dwellings, the textiles they weave, or the masks or costumes they invent for their dances, and other symbolic purposes, color is used fluently and brilliantly. This primitive use of color is such a challenge that modern sculpture, modern painting, and modern architecture have constantly gone back to it for power and guidance. I think it is terribly important that we learn from the natural use of materials which we have in our environments. Our failure to do this has qualified our whole existence to such a point that we are barren of taste and feeling in this respect.

There is another interesting point in the reading of the color environment. The more brilliant the light the more brilliant the use of color. As one moves away from the equator the light gets softer and less color is used. As one gets into softer light one finds less color than is found along the equator. All through Mexico, Guatemala, Central and the equatorial part of South America, brilliant color is used in all buildings. Probably color is used to cut down glare. As one goes northward from these areas the opposite use of color takes place. Light tends to destroy color. In this respect light seems to be more important than color itself. The refraction of light can almost completely destroy the appearance of color if the light is brilliant enough.

In terms of daily teaching we need to recognize that color is the least expensive tool we have. We can attract a student's attention instantly by a brilliant design. But most of the apparatus for

teaching is on the drab side. Learning effectively to read the color environment is an important educational problem. I have indicated some of the basic principles that are involved. Also, I have pointed out some of the advantages which accrue from a proper use of the color environment. It is to be hoped that we shall soon make color reading an effective part of educational practice.

DIFFERENTIATED READING OF FILMS*

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There have been many definitions of reading and various types have been identified in accordance with basic definitions. Studies of the psychological processes involved in reading make it clear that the emphasis should be placed on the acquisition of meaning rather than on sensory motor skills, and that discriminative interpretation of sensory stimuli is not confined to the printed page. Our understanding of how to read pictures is limited because we have not progressed far with our definitions and analyses. This paper will attempt to type the motion picture in terms of its use in education with a view to indicating that there are kinds of reading involved in interpreting educational films just as there are differentiations in extracting meaning from various forms of written expression which one views on the printed page.

Any attempt to outline a comprehensive functional differentiation of educational films requires that attention be directed to basic considerations. One is that the chief educational value of films is their power to communicate concepts involving motion. For example, motion pictures can present to the learner (1) the observable movement of objects, singly and in relation to each other; (2) the movement of objects too slow to be seen by an observer; (3) the movement of objects too fast to be studied analytically; (4) the motion of the unseen; (5) the motion of the imaginary and of abstraction; (6) the motion of rhythm; (7) the motion involved

*An expansion of the material on types of films in this paper will appear as Chapter II of *The Film and Education,* to be published by the Philosophical Library, Godfrey Elliott, editor.

in depicting the flow of events separated by intervals of time and space; (8) the motion involved in the interaction and flow of ideas between persons as expressed by spoken words, gestures, and other bodily movements.

A second basic consideration is that the motion picture has the power to communicate ideas in a realistic, concrete manner not possessed by language. Reading ideas presented by the motion picture have an immediacy in meaning; extensive verbal explanation is unnecessary. The motion picture effectively balances verbalism in teaching.

A third consideration is that the motion picture can be used in connection with all types of learning. It provides a model for the learner to imitate in developing motor coordinations. It builds vivid associations and memories. It presents problems for solution and basic images for effective critical thinking. It teaches appreciations and develops attitudes. And it can be used to stimulate strong emotional responses.

Finally, the motion picture is a timesaving educational tool. It saves hours formerly spent on field trips by bringing such experiences into the classroom. It introduces and summarizes topics in a brief, effective manner. It reduces time-consuming repetitive drills and explanations. It directs the learners' attention to pertinent subject matter. It creates interest, thus saving the teacher's time and energy. And it makes possible the presentation of subject matter which could not be presented in any other way.

Many types of educational motion pictures have been produced, however subject-matter interests and the needs of students vary so widely that teachers, even with a common set of ultimate educational goals in mind, see different values in a film as teaching material. This in part explains why many attempts to administer simple evaluation charts for educational films have met with little success. The educative value of a film depends on the purpose which the teacher has in mind and the use made of the film to achieve that purpose. In education the types of films which can be used successfully are so diverse that producers seeking a simple production formula for educationals find that no single pattern exists. Obviously, the classification of types of educational films based on use may be of value. Furthermore, a functional differentiation of films indicates the differentiation in the kinds of reading involved.

The first type of film which we may list is the *narrative film*. Its chief characteristic is that it tells a story. The narrative film may be animated with cartoons, puppets, or models, or it may use actors

in natural or studio settings. The narrative film is a type which has been in use for many years. It has depicted children's stories and fairy tales. George Kleine's *Catalog of Educational Motion Pictures,* published in 1910, lists a few narrative films, notably *The Night Before Christmas,* based on the legend by Clement Clarke Moore. Recent examples are *Pudge,* produced by Children's Productions, *The Hare and the Tortoise,* produced by Encyclopaedia Britannica Films, and *Beanstalk Jack,* distributed by Castle. It has been used to tell more factual narratives, such as the story of wheat and of corn, for use in the upper grades. It has been used to teach adults, a recent example being Walt Disney's *Water—Friend or Enemy.* The narrative type of film may use the pictures to tell the story, or it may use the commentator's voice to tell the story, or it may use the voices of the actors, or voices may be given to animals, puppets, cartoon personalities, or to objects. In Disney's *Water—Friend or Enemy* the water tells the story. And music may be used to add to the effectiveness of the presentation. Obviously, a wide variety of patterns may be used. In reading a narrative film the flow of the story should be uninterrupted.

The second type is the *dramatic film,* which is primarily theatrical and is used in connection with the study of the drama and of literature, or for recreational purposes, or for the development of discriminating attitudes of theatrical motion picture appreciation. The dramatic film is more highly charged with emotional appeal than is the narrative film. It differs also in that it was produced at the outset for entertainment purposes, whereas most educational films of the narrative type were produced with a school or teaching situation in mind. *A Tale of Two Cities* is a good illustration of the educational dramatic film. Reading dramatic films may vary from analytical study to concentration upon the emotional appeal of the drama.

The third type is the *discoursive film,* which presents a topic or series of related topics in a logical, systematic, and authentic manner. It employs the style of an essay, textbook, or lecture. The discoursive film is informational, since it is generally produced in a typical illustrated-lecture pattern. It also gives training in following the reasoning of an orderly presentation. The discoursive film is useful for introducing a topic or a unit to a class, or for supplying background experience, or for summarization. A good example from the early silent films is *The Life History of the Monarch Butterfly,* produced by the Society for Visual Education. Good examples of more recent sound films are *Truck Farmer,* by Encyclopaedia

Britannica, and *Winged Scourge,* by Walt Disney. Such discoursive films have a valuable function in education. In reading films of this type concentration on the logic of the presentation is involved.

The fourth type is the *evidential film,* which is used chiefly to record scientific data for study and analysis. It may also be used to make records of events for correlation with other data. In educational circles, extensive use of the evidential type of film is now being made in the natural and physical sciences, in the applied sciences, and in physical education. Time lapse and slow-motion photography are employed extensively in making evidential films. For example, the botanist studies the growth and movements of plants by time-lapse photography. The ornithologist studies and analyzes the flight of birds by means of slow-motion photography, and his findings are applied to the design of airplanes. The engineer studies the fatigue of metals by means of motion pictures. The trained surgeon's delicate operational skill is recorded in slow-motion and is analyzed for the purpose of developing better techniques in teaching the untrained student. Perhaps the most systematic use of the evidential film today is to be found in college football. It is now standard practice for each coaching staff in the large universities to make a slow-motion record of every game. Within two or three days following the game the coaches and players analyze the record to determine the strengths and weaknesses of plays and of the performances of individual players. Many large industries employ competent photographic staffs and maintain completely equipped laboratories in order to study and improve techniques and processes systematically.

The evidential film has made, and will continue to make, a large contribution to human knowledge. When reading the evidential film is shifted from examination and analysis to the acquisition of information, it becomes in use another type of educational film which we shall discuss next.

The fifth type is the *factual film,* which treats a topic or series of topics in an encyclopedic manner for the purpose of conveying information. The factual film differs from the discoursive film in that it presents an episode or series of episodes rather than a systematic logical treatment of a topic or series of related topics. Newsreels and many of the travelogs may be classified as factual films. The catalogs of educational films, from that of George Kleine (1910) to the present, have been filled with titles of factual films. Let us cite a few examples. The first three are silent films produced by Eastman Teaching Films; *Microscopic Animal Life, Alaska,* and

Digestion. The next two are sound films produced by Erpi; *Beach and Sea Animals,* and *Shelter.* Like the discoursive type, factual films have been relatively dull. To many, they characterize educational motion pictures because they have constituted a substantial majority of the films produced for classroom use. The chief value of the factual film is to provide direct background information to assist in the study of a unit or topic. Factual films bring into the classroom, experiences that could not otherwise be gained except from direct observation by means of expensive field trips and the use of laboratory equipment. In reading factual films meaning is gained from discriminating interpretation and study.

The sixth type is the *emulative film,* which shows how to perform an act of skill or demonstrates patterns of behavior which the learner imitates. During the war this type of film was used to teach trainees how to manipulate apparatus and machines, and how to behave under combat conditions. It was especially helpful in training airplane pilots, gunners, and technicians. Before the war, the emulative film had been used to train learners in sports, in first aid, in child care, in industry, and in many fields in which good muscular coordination is important. Since the war, a number of films of the emulative type have appeared. Some examples are *Dinner Party* and *Let's Give a Tea,* by Simmel-Meservey; *You and Your Friends,* by Look Magazine, in collaboration with Association Films; and *Play Ball, Son,* produced by Bert Dunne. The so-called demonstration film, in which a scientist demonstrates a difficult laboratory experiment for the purpose of informing students, is not to be confused with the emulative type of film. Rather, it should be classified as a factual film or discoursive film, depending upon the content or use. In reading emulative films the emphasis is placed on establishing visual patterns which serve as guides to the learner in his own behavior.

The seventh type is the *problematic film,* which sets problems for discussion and supplies the basic data for thinking. The Commission on Human Relations of the Progressive Education Association produced a number of films of this type before the war by extracting problem situations from dramatic feature pictures. During the war the armed services used problematic films with success. One in particular was employed by the Navy to screen pilots who were incapable of carrier duty. A good example of a problematic film which has been released since the war is *You and Your Family,* produced by Look Magazine in collaboration with Association

Films. Reading problematic films involves careful observation of facts and relationships.

The eighth type is the *incentive film,* which motivates action in the direction of developing character, attitudes, morale, and emotional response. The so-called documentary film would come under this classification. Films which are made to propagandize and to promote sales are of this type, also. Incentive films make use of all types of motion picture techniques to provoke the observer to action. The commentary, dialogue, sound effects, and pictures generally move fast and are rhythmically combined to stir strong emotional response. In some incentive films the stark reality of the pictures themselves serves to achieve this purpose. Such a film is *Seeds of Destiny,* produced by the U. S. Army Signal Corps.

It is the opinion of the author that the term documentary film, mentioned previously, is misleading. Documentary means "the conveyance of information or evidence for the establishment of facts," according to Webster, and does not imply the arrangement of the evidence for the purpose of inciting to action. Strictly speaking, a documentary film should be synonymous with a factual film. However, the "documentary" type which has become popularly known as such is in reality an incentive film. Although the scenes of the "documentary" film are generally real life filmed on the spot without sets and actors, yet the angle of view, the editing and arrangement of scenes, and the sound effects, are all combined to establish attitudes and to arouse emotional response. For example, witness *The River* and *The City.* Likewise, the March of Time films should with few exceptions be classified as incentive. The armed services made excellent use of incentive-type films during the war to combat disease, to build morale, to change and develop attitudes, and to create a better understanding of the war's purposes. The success with which incentive films have been used during the war years has strong implications for postwar education, particularly at the adult level in teaching human relations and international understanding. Incentive films should be shown without interruption in order that the full emotional impact of the presentation be felt by the reader.

The ninth type is the *rhythmic film,* which is used to achieve artistic effects and to develop aesthetic responses. For example, *Anitra's Dance,* distributed by Gutlohn, and Walt Disney's *Fantasia.* The rhythmic film is characterized by the use of moving patterns of color, light and shade, geometrical design, and pictorial effects, combined with music and other sounds. These films are constructed to appeal to the inborn rhythmical nature of the ob-

server and to his aesthetic senses. Very few rhythmic films have been made. They may be regarded as being in the experimental stage. In reading rhythmical films the emphasis is the same as that experienced in reading concert music and works of art. Analytical studies should be used only to heighten the aesthetic response.

The tenth type is the *therapeutic film,* which is used in medicine in connection with the educational rehabilitation of psychoneurotic patients. Examples are the *Auroratone Films* produced by the Auroratone Foundation of American, Inc., Hollywood, California. These films employ some of the techniques used in the rhythmic type and are in the experimental stage. It is reported that therapeutic films are being used with success.[1] In reading this type of film the emotional response is observed by experts. These responses are used as spring boards to explore further the difficulties which are blocking the normal behavior of the individual.

The eleventh type is the *drill film,* which sets forth repetitive exercises in which the observer participates during the showing of the film. Examples are the reading-drill films produced by Dearborn at Harvard University and the mechanical-drawing films constructed by Rising at Purdue University. Like the ninth and tenth types, drill films are in the experimental stage. It is to be hoped that more drill films will be produced in the near future, since there are many teaching situations in which they could be applied. In reading drill films discriminating observation and participation are required. The films may be stopped and repeated many times.

The eleven types of educational films here listed are offered as a working basis rather than something which is final. It may be expected that other types will appear and that there will be many subclassifications based on use. Furthermore, there are and will be combinations of types which will make exact classification difficult unless the educational goals to be achieved by using a given film are known.

It is hoped that this analysis of educational films will result in more intelligent use of film and in developing more effective production patterns. Clearly, a typical incentive film should not be used as a drill film, and vice versa. Nor should a factual film be used in teaching dramatic appreciation to a class in English literature. Likewise, a producer would be foolish to produce a narrative

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[1]Herbert E. Rubin and Elias Katz, *Auroratone Films for the Treatment of Psychotic Depressions in an Army General Hospital,* Journal of Clinical Psychology, Vol. II, No. 4, October, 1946, pp. 333-340.

film when the emulative type is indicated. The discussion of the eleven types of educational films should serve also to give the reader some notion of the broad extent to which films are being used effectively in education at all levels. Research is needed to determine which reading processes are most effective with each of the major types of films discussed. As was stated in the first paragraph of this paper, our understanding of how to read pictures is limited. It is hoped that research may be directed to the exploration of reading pictures in order that audio-visual instruction may progress on a sound basis.

READING COLOR

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Down through the ages color has been intimately associated with the religious, cultural and commercial life of all people. From that distant time some 50,000 years ago that man scooped red and blue pigments from the earth and painted both his body and the walls of his cave, all races and creeds have employed color to symbolize social standing, natural phenomena, customs, and mores.

Thus coincident with the beginnings of man was the generation of a basic system of unspoken language. This was based on the fact that every color has its primary association. For every color there is some one thing or things that is most closely associated with it in the subconscious mind. Development of this language has been both natural and arbitrary and has resulted in color having definite functions to perform in the field of human endeavor. The natural development of color has resulted from the inherent symbolism of color itself. Out of the color red, for example, people the world over can read basic mutual messages. It is the color of blood and this conjures images of war, courage, and ultimately lofty idealism. This particular connotation of red is in the natural field.

Physically red is the strongest of all colors. This factor, taken together with the "read-into" significance of red, has prompted man to arbitrarily employ it as a signal for danger. The companion use of green as a signal for safety has a similar basis of dual develop-

ment. Green is the color that nature uses to signal the coming of spring. Green is also a calm color evoking from the human an attitude of peace and repose.

Along a somewhat different line the silent speech of color serves as a guide for such divergent operations as steelmaking and weekly shopping. By means of a spectroscope of unusual power and properties the metallurgist can read the exact composition of steel by varying colors. The housewife doing the weekly shopping chooses her meat to a great degree by its color. Rich, red hues of meat attracts her shopping eye. Likewise in the green goods department, the ripeness or overripeness of fruits and vegetables are revealed by color.

Although mankind has used color rather extensively since time immemorial it has been only recently that man has discovered that color could actually work for him. This appreciation of color is the result of two-fold progression on the part of man and nature. Man's part was more or less as a spectator and imitator while nature was the creator. At birth the world was just a mass of shadowy grays, drab and devoid of bright colors. It was not until the rays of the sun permeated the dismal darkness that the earth got its first touch of color.

As the struggle for self-preservation started and became more complex, the evolution of color began. Despite the fact that nature has created color patterns that are aesthetically perfect, beauty of form and design were of secondary importance. The first and primary task of color in the natural world was concerned with a practical note. It was to serve as a universal signalling system and the means for maintaining an equilibrium of life.

Plants that depend on insects for cross-pollination, for example, were given colors to attract insects rather than to be simply clothed in beautiful raiment. It might be noted that some of these colors are in the ultraviolet range and beyond human vision. Plants whose pollen is wind-carried are far less colorful than others. Animals like the rabbit, and birds like the quail, whose physical structure lacked the natural weapons for protection were given both camouflage and speed as compensation. In countless instances in both the animal and vegetable world nature relies on many color tricks to preserve all manner of species.

GEOGRAPHY INFLUENCES COLOR. Color consciousness has also been greatly influenced by geography. People who live in the tropics developed a liking for the lighter, happier colors symbolic of or associated with the sunshine that filled their lives. This is largely re-

sponsible for the gay and colorful pottery, shawls, and art work of nations such as Spain, France, Italy, and Mexico. Another manifestation of this is in the color patterns developed by the Indians of Southwestern United States. Similarly the inhabitants of cooler northern countries became familiar with the cooler, less brilliant colors in the blue range which predominated their daily lives. These same factors also have a direct bearing upon the emotional development of the people with those from the warm countries possessing gay, unrestrained natures and those from colder climates being more stolid and phlegmatic.

In a nation as large as the United States, for example, there is a definite color preference according to location. For example, in the south the warm colors are liked, but in the New England area the preference is for subdued colors. Pastel shades of the warm colors are the choice of the people on the Pacific Coast and in the Southwest stronger hues of the warm colors are most in evidence. In the Middlewest and Northwest, particularly the prairie country, the colors between the warm and cool shades are most widely used. This sectional color preference manifests itself in many ways. For example, a survey by the Automobile Manufacturers Association proved that such prosaic things as trucks are painted in more conservative shades in the Eastern and Northern sections and bright motifs feature those from the colorful West and South.

ART AND SCIENCE COMBINE. Over the centuries man has developed his basic color instinct to a high degree. Famous artists from all countries have captured the colors of nature and transferred them into permanent paintings. Such artistry, however beautiful, was more in the vein of imitation rather than creation and despite the fact that each successive generation used color more and more harmoniously, man in general was unappreciative of basic color theory.

It was not until comparatively recent times that man began delving into the elemental uses of color in the natural world. For example, it was not until after the turn of the last century that man attempted to fathom for practical purposes the secret of nature's excellent art of camouflage. It was only natural that this research into what might be termed the negative use of the power of color should lead to further study of the positive effects of color. This research gained impetus in the years between the wars and eventually resulted in the establishment of the Principles of Color Dynamics.

The growing knowledge of color in the past few years has resulted in many unusual but highly effective applications on a purely

practical basis. Each of these concretely demonstrates that color has inherent psychological effects and to a certain extent physical influence. From the nature of these applications it is evident that people are thinking out their decorating problems and foregoing that old line of least resistance epitomized by the phrase "any color will do just as long as it is not black." It has at various times been humorously suggested that the reason there are so many pessimists in the world is because children's school rooms of the past were dismally decorated with ugly "school browns" and "school grays." This may not be so much of a joke, at that, for modern psychologists point out that children react to the environment in which they study and play. Impressions received in childhood from any source whatsoever can do much to make or mar a child's mental welfare for life. Many of the impressions which the child carries through life are formed in the classroom. Today with the application of color principles, the school room can be light, pleasant and connotative of happiness thus starting the future citizens on the road through life in an eminently satisfactory manner.

Typical of some of the unusual ways in which color is being used is the particularly adept application in the aviation industry. Harking back to early aviation history, the Piccard Brothers, pioneer aeronauts, discovered through actual experience that even black and white have potent power. The positive effect of colors on temperatures was nowhere better illustrated than by their ascents into the stratosphere. The air in the gondola of the balloon in which they made their first ascent reached the temperature of 100 degrees Fahrenheit while the atmospheric temperature registered 75 degrees Fahrenheit below freezing. This is accounted for by the fact that the gondola was painted black and absorbed the sun's rays. For the second trip the Piccards painted the gondola white, reflected the sun rays and produced just the opposite effect.

Modern airline officials are also finding that color has certain other powers that directly affect passengers. When one company painted one of its planes all white, many passengers shied away from it because it seemed suggestive of a hospital. When the color was changed, business improved. Another company found, that yellow and brown linen can cause nausea in cases where the individuals are sensitive to color, while greens and blues help to avert this unpleasantness. One color consultant advised an airline to use green linen, and to avoid serving coffee because it was brown.

UNUSUAL EXPERIMENT. A positive, but somewhat bizarre experiment demonstrating the effect of color on food and beverages was

conducted by an authority on light, and color. A dinner was arranged and preparations included a dual lighting system. One was composed of special filter lamps which cut out all the ordinary spectrum except green and red. The other used ordinary light bulbs. The latter was on as the guest sat down at the table to behold an appetizing array of food. Suddenly the filter lamps were cut in and the ordinary lamps turned off. The guests experienced queer, sickening reactions. Luscious steaks became a most unappetizing gray, glasses of milk had a nauseating blood-red tinge, the green peas became masses of black pellets, salads became blue, coffee yellow, and all in all the perfectly prepared food became repulsive. Although this was an extreme test, it conclusively proves the effect of color on the senses.

The actual physical power of color was graphically demonstrated in a certain assembly plant. This plant consisted of two large connecting assembly rooms. As an experiment one section was painted according to the Principles of Color Dynamics with a combination of eye-rest and morale building colors. The other area was painted the usual white. Soon the girls working in the white room complained of being too cool. They wanted to be transferred to the colored room which they said was warmer. Tests made in both rooms proved that the temperatures in the rooms were the same. This is another example of the psychological effect of color, as white imparts the feeling of lifelessness and lack of warmth.

CAN BLIND FEEL COLOR? One of the most unusual and yet practical applications of the Principles of Color Dynamics is in the workshops of the Industrial Home for the Blind, Brooklyn, New York. After extensive experimentation carried on by the institution in cooperation with color and lighting authorities it was disclosed that the color of walls, machines, and furnishings in the workshop definitely helped the blind workers perceive these objects. The employees in these workshops, although legally blind, possessed a slight power of visual perception. In most cases the optic nerves were severely impaired but not totally destroyed. It was to heighten and greatly increase this limited visual power that the color and light program was undertaken.

The color pattern finally decided upon by the engineers closely paralleled the principles that Color Dynamics prescribe for general industrial use. There were, of course, several exceptions. In place of the standard darker greens for walls and machine backgrounds a slightly lighter grayed-green was chosen. Yellow, which has such an arresting effect on workers with normal vision, was replaced with

orange because tests demonstrated that the blind workers could see this more easily. Thus orange was used in painting the vital parts of machinery, safety guards, mobile equipment, electrical switches, and other similar objects which constituted a safety menace. For this particular application it was discovered that cream or an off-white was most suited for the ceilings.

Discussing the results of this color program the institution's managing director, Peter J. Salmon, indicated that the blind workers now perform their work much better and that there are not as many minor accidents such as bumping into objects. He said that many of the workers have been enthusiastic in their appreciation of the new color pattern. "Even with limited vision," said Mr. Salmon, "the effect of bright colors and well lighted, cheerful interiors have the same morale lifting result on the near-blind as on persons with normal sight."

COLOR PROVIDES MENTAL STIMULUS. In the field of human behavior, it has been definitely established, color not only has a physiological effect on the human eye and nervous system, but it also has a profound psychological reaction on the mind. Certain colors have the "power" to elevate the mind while others can blunt the nervous system and act as depressants. Still others create confusion. The mental and physical impact on a person of proper and improper color can be compared with the reaction caused by sound or more particularly by music. The discord of untrained musicians has a jarring effect usually to the point of physical reaction. On the other hand the beautiful cadences of a trained symphonic group can guide the mind and body through various moods ranging from sadness to sublime happiness. Color harmony, physical as well as visual produces essentially the same reaction as any other harmony. When properly utilized, a particularly desired effect is produced. When improperly used it creates a discordant element. Modern research in color has been aimed at establishing the basic concepts of visual and physical color harmony on a basis by which they can be applied to daily living.

Progress in developing color principles was slow but certain with research covering broad fields. Scientists, ranging from botanists to oceanographers, were discovering new and important facts about color and its effect on nature, people, and the life processes. A micro-biologist discovered that barnacles did not like light surfaces and that ship bottoms painted white, yellow or light green would repel the creatures. Working with weights other scientists proved that the average person will judge weights heavier under

red light than under green or blue light. They also found that people will imagine that boxes painted a light color will seem less heavy than the same boxes painted black. Scientists studied the effects of color on blood pressure, and upon muscular, mental and nervous activity. They found that colored light had a pronounced effect on muscular reaction. In ordinary light this muscular activity was found to be 23 units, increasing to 24 units for blue, 28 for yellow, 35 for orange, and 42 for red.

RESEARCH IS EXTENSIVE. Research revealed that red colors grow dim and blue and green more pronounced when the ears are exposed to loud noises. Strong odors produce the same effect. Government insectologists found that by using yellow color on traps, more beetles were attracted than with any other color. Experiments by botanists with plant growth under different color conditions indicated that red light would help considerably in growing certain plants. Another investigator found that by subjecting a person to a given color for five minutes there could be detected differences in the effect of various colors upon different physical activities, memory, and mental work. These seemingly isolated, yet inter-related findings were studied by the color engineers concerned with developing the use of color on a sound, scientific basis.

This research substantiated the proposition that every color, as a member of the visible light spectrum, has a different wave length that can be harnessed for practical use. These wave lengths have been measured and are as follows:

Color	Wave Length
Limit of visible violet	16 millionths of one inch
Heart of violet	17 millionths of one inch
Heart of indigo	18 millionths of one inch
Heart of blue	19 millionths of one inch
Heart of green	20 millionths of one inch
Heart of yellow	22 millionths of one inch
Heart of orange	26 millionths of one inch
Heart of red	30 millionths of one inch
Limit of visible red	32 millionths of one inch

COLOR HAS ENERGY. Light or color is electromagnetic energy and the visible light or color is one octave of the electromagnetic spectrum which contains from sixty to seventy octaves. The power of X-rays, ultra-violet, and infra-red rays are well known and have been used by medical and therapeutical science to perform certain func-

tions. These rays are neighboring octaves of the visible light rays and if the invisible rays have motion or energy, it may be assumed that the visible rays possess the same degree of power.[1]

The sensation of color is produced by the action of the visible waves, traveling at a rate of 186,000 miles per second, upon the eye as they reflect from an object or surface. Within the retina of the eye are thousands of little rods and cones. The rods collect the light and the cones the color waves. Each material or surface absorbs some of the color waves and reflects others with the reflected waves producing the color effect upon the cones in the eye. A red rose is not red because it is pigmented red—but because its mechanical and molecular structure absorbs some of the light rays or wave lengths of all other colors *except red,* and this is what is seen. Thus it is apparent that with these waves impacting the eye at such terrific rate, the surfaces on which the eye rests should be of shades that do not produce irritation and constitute a mental and physical menace. Red, for instance, which has a longer wave length than yellow, green, blue or violet, is transmitted as a stronger color note. This is probably why the eyes and brain become more tired than when looking upon colors of lesser wave lengths.

COLOR PROVIDES STIMULI. The act of seeing, that is the actual transmission of an image from the object to the mind involves physical stimuli, physiological processes, and psychological reaction. All are of equal importance in consummation of the process. The stimulus is provided largely by the color of an object although shape or form is also a determining factor. If every object were the same color physical stimuli would be very limited and the physiological phase of the vision act would be severely strained in impacting an

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[1]This conclusion is based on the following reasons:

1. All electromagnetic energy is identical except in wave length and frequency.
2. All types of radiant energy travel at the same rate of speed —186,000 miles per second, and this, divided by the wave length of each, establishes this frequency.
3. Each color has a definite wave length—from 1/16 to 1/32 millionth of an inch—and therefore varies in frequency and impact force.
4. The rays of the electromagnetic spectrum serve an almost limitless number of uses—radio, television, infra-red photography, ultra-violet fluorescent light, X-rays, and gamma rays.

image. This would naturally result in physical fatigue as witness trying to distinguish shapes on a snow-laden landscape. Fortunately color comes to the rescue and can make the entire vision process possible with a minimum expenditure of physical energy. Color can do this because as a member of the electromagnetic spectrum each color has its own wave length, basic properties, and individual characteristics.

BASIC COLOR PROPERTIES. All colors have certain basic qualities and characteristics. Basic to each color are (1) hue, (2) value, and (3) chroma or intensity. Hue is that property by which one color is differentiated from another. It is the name, such as blue, red, or yellow which has been applied to the variations of the color separations of the spectrum. Sir Isaac Newton, following his famous "Experimentum Crucis" with the spectral colors (color of a heterogeneous light source such as sunlight as selected by a refracting prism), named seven different hues, i.e., violet, indigo, blue, green, yellow, orange, red. Subsequent research and experiments with precision measuring instruments reveal that there are only four pure spectral colors, blue, green, yellow, and red and over a hundred different hues in the spectrum. In naming seven Newton was undoubtedly following a quantitative measurement and was influenced by the physical conspicuousness of the seven hues. The three colors, violet, indigo and orange, which Newton added to the four pure spectral colors upon intense examination are found to have tinges of one or more of the four pure colors. The value of a color is its quality of lightness or darkness such as light red or dark red. A color in full natural strength is a normal color. If it is lighter than normal it is a tint, if darker it is a shade. By chroma or intensity is meant whether a color is strong or weak.

In addition to these basic qualities colors have other properties which determine their functional use. All colors can be classed as either warm or cool from a psychological basis. It is interesting to note, in this respect that those colors whose wave lengths most nearly approximate the heat wave lengths in the ether are warm colors, those farthest removed from the heat vibrations are cool colors. Following are some of these characteristics:

1. *Warm and Cool Colors*—Warm colors are those in the range of yellow, orange, and red. They suggest heat, blood, sunshine. In the school rooms, for example, they are used to compensate for lack of natural illumination and are used for northern or eastern exposure. Cool colors

are those in the blue range and suggest ice, snow, and clear cold water. They are used for an effect of calmness and restraint. In schools they can be employed to counteract an overabundance of sunlight from a Western or Southern exposure.

2. *Advancing or Retreating Colors*—Warm colors are generally classified as advancing colors because they have the power to make surfaces appear to come forward. Cool colors tend to make surfaces on which they are used recede. These qualities of color make it possible to use color to alter visually the proportions of a school room.

3. *Stimulating, Relaxing and Calming Colors*—Generally speaking the warm colors are those that stimulate and promote efficiency. When properly used they create a most pleasant environment. Of all colors known, green has the most relaxing effect on mind and body. Nature's extensive use of green in field and forest is ample evidence of this. Various shades of green such as Eye-Rest, Vista and Seafoam form the basis of properly engineered color schemes in a majority of instances in a school. Blue is a calming color and can be used extensively in the form of Cascade Blue and Stratosphere Gray in the schools to promote peace of mind and a calm, quiet atmosphere conducive to study.

In summary it might be said that color and Mark Twain's famous weather formerly had very much in common. Both were always present and not much was done about either. There is not yet very much that a person can do about the weather except prepare for it. About color, however, there are a great many things that can be, and fortunately are being done. People, from tillers of the soil to superintendents of sprawling factories, are awakening to the realization of the true meaning and effect of color. There is a growing understanding in practically every level of business and social life that there is more to color than meets the eye.

This nation-wide revolution in painting and decorating is creating new and pleasant surroundings in factories, hospitals, schools, homes, stores, and other structures in which men and women work or live. It is bringing about a needed and welcome transformation.

The drab, bleak, or inharmonious color schemes of yesteryear are being changed to smooth, beautiful and functional color patterns as modern and efficient as atomic energy.